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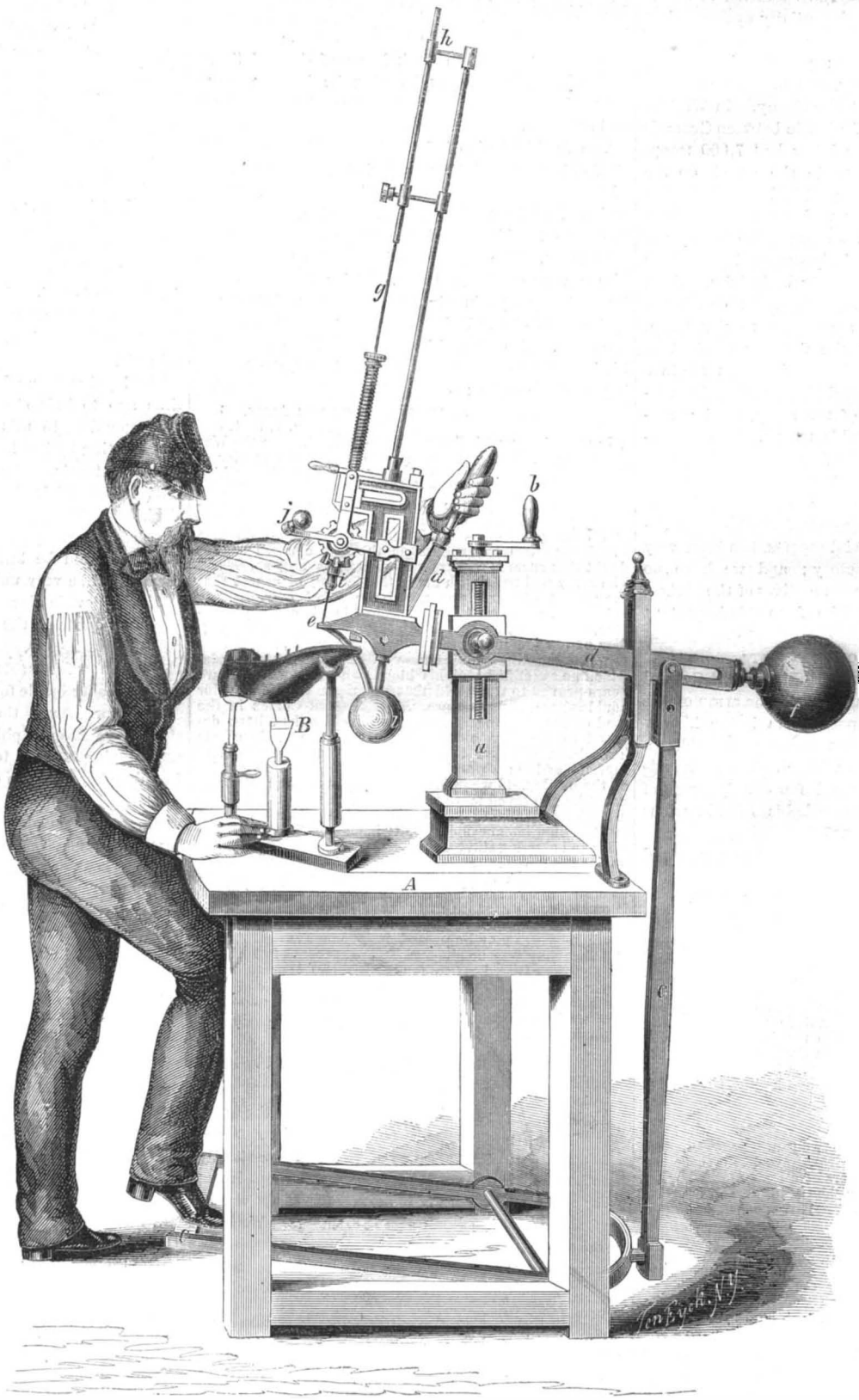
Shoe-Soling Machine.

We translate from the *Saxonian Industrial Gazette* the following account of an improved mode of fastening the soles of boots and shoes :

The method of uniting the upper leather or vamps with the inner and outer soles of boots and shoes by means of screws inserted by machinery instead of the usual thread or wooden pegs, is not new, it having been in use in Paris, France, ever since 1847. Within a few months, however, the shoe-pegging machines have been considerably improved and rendered practicable for hand work, by M. Lemercier, a leather dealer in Paris, and a number of his machines have been sold which are in successful use all over France and Germany.

In the old machines, which are driven by steam, the thread is first cut on the wire by means of an ordinary screw plate, and then it is introduced into the shoe machine, which fastens it in the leather. This new machine cuts the thread on a continuous piece of brass wire and forces it into the leather without requiring a hole to be made to receive the screw. No motive power is required, and one experienced hand is able to secure from thirty to thirty-five pairs of soles in ten hours.

This machine is represented by the accompanying engraving. On an ordinary table, A, of hard wood, the frame, *a*, which supports the machine, is firmly secured, and the lever, *d*, is so arranged that it can be raised or lowered by means of the screw spindle, *b*. Attached to one end of the lever, *d*, is the screw plate, *e*, and to the other the balance weight, *f*. The brass wire, *g*, is guided by the tube, *h*, and it is caught between two jaws, *i*, that are rotated by the crank, *j*. By these means the brass wire, *g*, is inserted in the screw plate, *e*.



LEMERCIER'S SHOE SOLE-FASTENING MACHINE.

The operation is as follows :—The workman secures the last which carries the shoe to be provided with a sole on an adjustable standard, B, and then he depresses with his foot the treadle, C C, whereby the lever, *d*, is raised and the screw plate, *e*, is firmly pressed down upon the sole to be fastened. By turning the crank with his right hand, the workman causes the brass wire to pass into the screw plate, where the thread is cut, and by continuing the rotary motion it screws into the outer and inner soles, between which the upper leather is turned in. The sole of the last is covered with a strip of sheet iron, so that the screws are prevented entering the last, and are slightly riveted against the iron. After the screw has been inserted, the workman cuts it off by operating with his left hand the shears, *k*. The brass cuttings from the screw plate drop down into the spherical reservoir, *l*. The size of the brass wire and the depth of the thread, which is regulated by adjusting the jaws in the screw plate, are selected to conform to the size and quality of the work. By means of the treadle, C, the upper leather is compressed tightly between the two soles, so that no moisture can enter the shoe.

This machine, which is sold in Paris for 1000 francs ($200), can also be used for the purpose of uniting leather belts. An experienced hand can insert from eight to nine screws per minute, so that he is enabled to do three or four times as much work as with the ordinary method of lacing or riveting the belts.

Telegraph Posts.

We observe that several patents have been taken out in England for different modes of securing telegraph posts in the ground so that they will not be blown down. One man has patented two devices for securing iron posts for telegraphs. He surrounds the post just below the surface with a broad horizontal disk, and arms it at the bottom with projecting wings. Excepting in the cities, it is not probable that iron telegraph posts will be used in this country at present, but it may be that improvements can be made in forming, setting or protecting those of wood, which are employed in such immense numbers.

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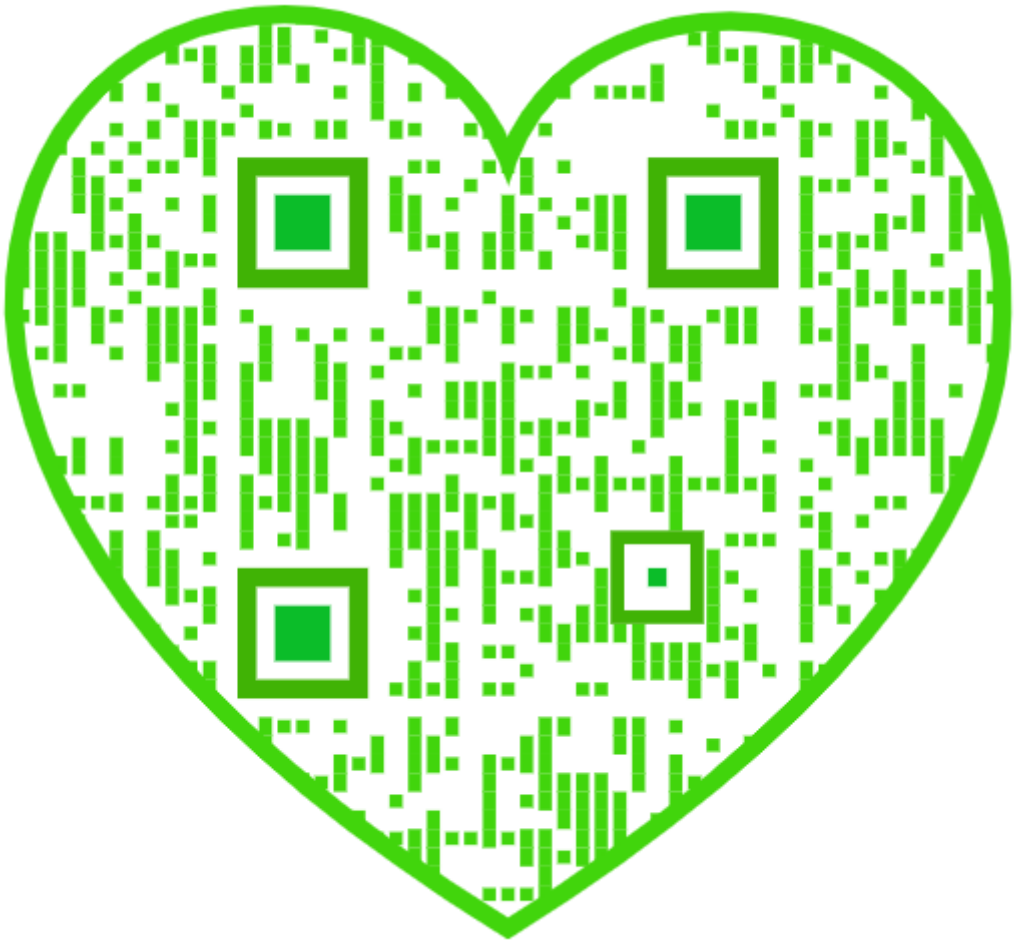

NOTES ON MILITARY AND NAVAL AFFAIRS.

THE SITUATION.

At the time of going to press, matters remained about as follows:—The great fleet, upon which so much hope is laid, was reported as being safe at Bull's Bay, about twenty-five miles above Charleston, S. C. This bay affords safe anchorage for the Federal fleet, and may be retained as a base for future operations. The depth of water inside the bar is twenty-five feet, and at high tide the depth is eighteen feet on the bar. It is thought by many that this movement is intended as a preliminary demonstration against Charleston. Such a movement, if successful, would be one of the most popular that could be carried out. It is understood that the government is fitting out two more great expeditions to operate on the Southern coast; one to be commanded by General Butler, and the other by General Burnside. The preparations are going on with great vigor. The condition of affairs on the Potomac remains substantially unchanged at latest accounts. The great storm had in some degree checked offensive operations; yet the commanding general is perfectly untiring, and means to succeed when he once gets fairly at the enemy. In Western Virginia we have reports of a battle between Generals Rosecrans and Floyd. The latter had 7,000 troops under his command, and made the attack on the Union forces from two points. The latest dispatches state that the Union forces under Generals Benham and Schenck had got upon a new road in the rear of Floyd, and expected to entirely surround him. The result of this battle is anxiously looked for. From Kentucky we have no very important or stirring news. The Union cause seems not to flag there, though it is thought that the fighting element of the State is Secession. In Missouri things are in a very unsettled state. General Fremont had been removed from the command of the army, causing considerable discontent among his troops. He expostulated with them, and in his farewell address urged upon them to render cheerful obedience to his successor, and to carry out the career so gloriously begun. General Fremont's management of the Western Department, according to official reports, has been very extravagant and unsatisfactory; and we have no doubt the President acted upon motives of the highest consideration in removing him from this important command.

RETIREMENT OF GENERAL SCOTT.

The voluntary retirement of Lieutenant-General Winfield Scott from the command of the army of the United States marks an important era in the history of this country. We do not propose to publish a biography of this war-worn veteran. His history is accessible to every reader and few are ignorant of the leading events that have made his life illustrious and honorable.

The following letter from Gen. Scott was received by the President:—

HEADQUARTERS OF THE ARMY,
WASHINGTON, Oct. 31, 1861.

The Hon. SIMON CAMERON, Secretary of War:—

SIR—For more than three years I have been unable, from a hurt, to mount a horse or to walk more than a few paces at a time, and that with much pain. Other and new infirmities—dropsy and vertigo—admonish me that repose of mind and body, with the appliances of surgery and medicine, are necessary to add a little more to a life already protracted much beyond the usual span of man. It is under such circumstances, made doubly painful by the unnatural and unjust rebellion now raging in the Southern States of our so lately prosperous and happy Union, that I am compelled to request that my name be placed on the list of army officers retired from active service. As this request is founded on an absolute right, granted by a recent act of Congress, I am entirely at liberty to say it is with deep regret that I withdraw myself, in these momentous times, from the orders of a President who has treated me with much distinguished kindness and courtesy whom I know, upon much personal intercourse, to be patriotic without sectional partialities or prejudices, to be highly conscientious in the performance of every duty, and of unrivaled activity and perseverance. And to you, Mr. Secretary, whom I now officially address for the last time, I beg to acknowledge my many obligations for the uniform high consideration I have received at your hands, and have the honor to remain, sir, with high respect, your obedient servant, WINFIELD SCOTT.

A special Cabinet meeting was at once convened and it was decided that Gen. Scott's request, under the circumstances of his advanced age and infirmities, could not be declined. The President, attended by his Cabinet, waited upon Gen. Scott, and read to him the following order:—

On the first day of November, A. D., 1861, upon his own application to the President of the United States, Brevet Lieutenant-General Winfield Scott is ordered to be placed, and hereby is placed, upon the list of retired officers of the army of the United States, without reduction in his current pay, subsistence or allowances. The American people will hear with sadness and deep emotion that General Scott has withdrawn from the active control of the army, while the President and unanimous Cabinet express their own and the nation's sympathy in his personal affliction, and their profound sense of the important public services rendered by him to his country during his long and brilliant career, among which will ever be gratefully distinguished his faithful devotion to the constitution, the Union and the flag, when assailed by parricidal rebellion.

General Scott thereupon rose and addressed the President and Cabinet, who had also risen, as follows:—

PRESIDENT:—This honor overwhelms me. It overpays all services I have attempted to render to my country. If I had any claims before, they are all obliterated by this expression of approval by the President, with the remaining support of his Cabinet. I know the President and this Cabinet well. I know that the country has placed its interests in this trying crisis in safe keeping, their counsels are wise, their labors are as untiring as they are loyal, and their course is the right one. President, you must excuse me. I am unable to stand longer to give utterance to the feelings of gratitude which oppress me. In my retirement I shall offer up my prayers to God for this administration and for my country. I shall pray for it with confidence in its success over all enemies, and that speedily.

The President than took leave of General Scott, giving him his hand, and saying he hoped soon to write him a private letter expressive of his gratitude and affection.

The President also informed Gen. Scott that his staff officers should be provided for. Each member of the administration then gave his hand to the veteran and retired in profound silence. Gen. Scott wept when the President read the paper authorizing his retirement. The Secretary of War also addressed to him a very excellent letter. Major McClellan was immediately appointed Commander-in-Chief of the entire army of the United States, thus setting at rest the silly stories about his removal. Upon assuming his important command he at once issued the following patriotic order:—

HEADQUARTERS OF THE ARMY,
WASHINGTON, Nov. 1, 1861.

In accordance with General Order No. 94. from the War Department, I hereby assume command of the armies of the United States. In the midst of the difficulties which encompass and divide the nation hesitation and self-distrust may well accompany the assumption of so vast a responsibility; but, confiding as I do in the loyalty, discipline and courage of our troops, and believing as I do that Providence will favor ours as the just cause, I cannot doubt that success will crown our efforts and sacrifices. The army will unite with me in the feeling of regret that the weight of many years, and the effect of increasing infirmities, contracted and intensified in his country's service, should just now remove from our head the great soldier of our nation, the hero who, in his youth, raised high the reputation of his country in the fields of Canada, which he sanctified with his blood, who in more mature years proved to the world that American skill and valor could repeat, if not eclipse, the exploits of Cortez in the land of the Montazumas, whose whole life had been devoted to the service of his country, whose whole efforts have been directed to uphold our honor at the smallest sacrifice of life; a warrior who scorned the selfish glories of the battle field when his great qualities as a statesman could be employed more profitably for his country; a citizen whose declining years have given to the world the most shining instances of loyalty in disregarding all ties of birth and clinging still to the cause of truth and honor. Such has been the career and character of Winfield Scott, whom it has long been the delight of the nation to honor, both as a man and as a soldier. While we regret his loss there is one thing we cannot regret—the bright example he has left for our emulation. Let us all hope and pray that his declining years may be passed in peace and happiness, and that they may be cheered by the success of the country and the cause he has fought for and loved so well. Beyond all that, let us do nothing that can cause him to blush for us; let no defeat of the army he has so long commanded embitter his last years, but let our victories illuminate the close of a life so grand.

GEORGE B. MCCLELLAN,
Major General Commanding U. S. A.

DISHONESTY OF ARMY CONTRACTORS.

In connection with furnishing supplies to the army and in performing contracts necessary to our national defence, the greatest amount of villany is constantly practiced. The army of contractors and suppliers of every grade and distinction, seem to be made up, in part at least, of the worst sort of elements. We have heard of those who were accounted mean enough "to steal cents off a dead man's eyes," but these are no worse than the horde of rapacious rascals who rob the government in every possible form. The worse department in this respect seems to be the Western, under command of General Fremont. The President has appointed Hon. Joseph Holt, of Kentucky, and Judge Davis, of Illinois, a commission to audit the claims against the government in this department. Mr. Holt is well known as a man of rugged honesty, and Judge Davis is said to be a man of similar character. We may, therefore, look to them for a report which, while it will mete out the sternest justice to swindlers, will, at the same time, pay the honestly-earned wages and the just claims of those who have served and supplied the government. If the government hopes to reform these abuses it must make an example of some of the leading swindlers. Hang them up as a scare-crow to others.

MISCELLANEOUS.

In our issue two weeks ago we alluded to the fact that Capt. Shaeft, late of the Patent Office, had been appointed Brigadier-General and sent to Kentucky. This appointment was made at the instance of Mr. Holt, who knew something of the sterling qualities of the man. At the late action at Camp Wild Cat, in Kentucky, where Zollicoffer was whipped, Gen. Shaeft was in command, having but just reached the encampment. The report of the fight says, "the conduct of General Shaeft was that of a veteran accustomed to fire."

Dr. Carl Haas, of the Fifth New York Volunteers, says that his regiment, though encamped seven weeks without tents, had not a single case of sickness. He recommends rye bread as more wholesome than wheat, as well as cheaper, and as to army cooking, he says that it should be done by regimental cooks, and not misdone by each company's spoiling its food for itself. He declares that he has known a whole company prostrated by one badly-cooked dinner. He also suggests that each man shall carry four yards of bandage, of three inches width, whereby his wounds may be dressed without a surgeon.

The Secretary of the Confederate Treasury announces that his coffers are running sadly behind the exigencies of the war. At the very best there is a deficiency of one hundred and seventy-five millions to be provided and no means are visible to meet it. The blessings of secession are begining to vanish into very thin air.

The loyal women of America were called upon some time ago to knit stockings for the soldiers. They are responding to this call with commendable zeal, and knitting by hand, which had about become one of the lost arts. The call is now made for woolen mittens, an article almost as useful to the soldiers as stockings. Many soldiers in the Crimean war were disabled in consequence of frost-bitten fingers. The mittens should be knit with a forefinger, otherwise they would be very unhandy in actual service.

The Louisville *Journal* says that Kentucky will soon have her quota of the half million volunteers in the field—about 25,000. The same paper also says that before winter fairly sets in, Kentucky will have 40,000 soldiers doing battle for the Union.

Professor Lowe, the balloonist, is having constructed in Philadelphia four large balloons for army use, ranging from 31 to 35 feet in diameter, and 100 feet high from the top of the balloon to the bottom of the basket. Some twenty persons are engaged in the work, mostly females. He is also forming a regular corps to transport and operate each balloon. The material is strong brown pongee silk.

Major Eaton's purchases of subsistence at New York for the first quarter of the present year amounted to $100,000. His purchases for the second quarter amounted to $750,000.

The Navy Department has recently ordered 500 more rifled guns. Immense quantities of shot and shell are being cast at all the foundries in the country.

The citizens of Buffalo, claiming Gen. Heintzleman as a townsman, have petitioned the President to appoint him Major-General. The list of signers is headed by Millard Fillmore. The gallant officer distinguished himself at the battle of Bull Run, and was severely wounded.

A contract for supplying 1,000,000 feet of lumber in Washington is awarded to F. S. Bletz, Columbia, Pa., for $15,480.

Nothing can excuse a General who takes advantage of the knowledge acquired in the service of his country to deliver up her forts and her towns. This is a crime reprobated by every principle of religion, morality and honor. The surrender of the command of the United States army in Texas, by Gen. Twiggs, is one of the most atrocious acts of this rebellion. This was done early after secession began, and Twiggs was appointed a General in the secession army. He has now gone into private life, despised, probably, by those very men he sought to serve. So with Floyd, Thompson and some other prominent men.

A gold snuff box and the freedom of the city were presented to Gen. Robert Anderson on the 20th ult.,

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by the Mayor and Common Council of New York, as a testimonial for his gallant conduct in the defence of Fort Sumter.

One of our painstaking city journals has carefully collated the aggregate loss on each side since the war began. The figures sum up as follows:—Federals, killed, 969; wounded, 2,041; prisoners, 2,374. Confederates, killed, 4,049; wounded, 1,604; prisoners, 2,808. These figures, however, do not include the killed and wounded of scouting parties, of which there is no official record.

Among the recent arrivals from Europe is Genreal Charles F. Havelock, late of the British army, and brother of General Havelock, whose name is so honorably associated with the East Indian rebellion. It is rumored that he intends offering his services to our government in the present crisis.

Wood and coal have run up to a high figure in Washington, in consequence of the closing of the Potomac by the Confederate batteries, the opportunity furnishing the dealers with an excuse for the same. Thus pine wood stands at about $7 a cord, oak wood at $10, and coal at $9 per tun. These are oppressive rates for the poor in the face of coming winter.

The workmen in the Portsmouth (N. H.) navy yard have resolved that each of the twelve hundred men present should give the amount received for one day's work to the Maine and New Hampshire soldiers now at the seat of war; the money to be appropriated to the purchase of blankets, stockings, &c., for those who have left all the comforts of home and gone forth to lay down their lives for their country's salvation.

Brigadier-General Kelly, at the battle of Romney, Va., noticed in our last number, took between 400 and 500 prisoners, among whom was Col. E. M. Armstrong, late member of the Richmond Convention, 200 horses, three wagon loads of new rifles, three cannon, a large quantity of corn, tents, and in fact every thing they had. The loss on the Union side was but one man killed and five wounded. The loss of the enemy is not known, but must have been considerable. The expedition was truly successful. Gen. Kelly still occupies Romney with a force of 2,500 men, consisting of two Ohio Regiments, six companies of the Seventh Virginia Regiment, one company of the Third Virginia Regiment, and two cavalry companies.

Unsinkable and Incombustible Ships.

A new British iron screw steamer, called *The Briton*, intended for mail service at the Cape of Good Hope, is built upon a new principle called the "Lungley system" after its inventor, Mr. C. Lungley. It is described as follows in *Mitchell's Steam Shipping Journal*:—

Each deck of the vessel is distinct from the others, having no communication with them, but having its separate hatchway or entrance from the upper deck; and the result of this arrangement is, that whatever injury may be incurred, to either one or even to two decks, the others will float. Thus for instance, should the lower deck be knocked away, the two upper decks will float the ship; or should either from a collision, the starting of a plate under the water-line, or from a shot or a broadside penetrating the sheathing, one of the intermediate decks let in the water even to the extent of filling the compartment from stem to stern, the buoyant power would still remain, and the vessel would not only float, but be perfectly manageable, the water merely rising up the trunk hatchway of that particular deck to the level of the water-line outside. The same subdivision of decks which affords the security against entire submersion, ensures protection against total destruction by fire. In the event of a fire being discovered on either deck, the hatchway of that deck would be fastened down, and the supply of air being thus cut off the fire would die out of itself, or if the fire had got too much hold upon the ship to allow of this, then the entire deck in which the conflagration was raging, might be filled with water without risk of other inconvenience than that of having to pump it out again. Another advantage of this mode of building is the perfect ventilation it ensures to all parts of the vessel. Each deck has its own ventilating shaft or shafts in the hatchways, which are its means of communication from above. These separate shafts likewise afford facilities for loading and unloading. The engine room of the *Briton* is not only protected by the water-tight deck division, but longitudinal bulkheads or iron walls running fore and aft some feet within the outer shell or sides of the vessel protect it from the chance of injury from without. Thus a fracture in the outside plates occasioned by collision, stranding, or shot, although it might admit the water into the ship, would not affect the engines or the fires.

THE GEOLOGICAL HISTORY OF NORTH AMERICA.

BY DR. STEVENS.

At the meeting of the Polytechnic Association of the American Institute, Oct. 31st, Dr. Stevens said—I have been requested by several members of the Association to occupy the preliminary half hour before the regular business for a few evenings in giving a brief history of the geological formation of this continent. I shall not enter into all the minute details which have been so laboriously studied out, but shall present only the more prominent features in that grand march of events which constitute this history. Our continent contains all the rocks that are known, and an account of their formation embraces the whole science of geology. I purpose first to present the facts and then to explain the mode in which they have been ascertained.

A long time ago—how long we have no means of knowing, but certainly hundreds of thousands, and probably millions of years—the Adirondack Mountains in this state formed a rocky, and perfectly desert island, in the midst of the ocean. At that time there was no life, either animal or vegetable, upon the earth. The rocks had not gone through the change necessary to fit them for the growth of plants. Even the sea was destitute of inhabitants.

Cotemporary with the Adirondack Mountains were several other hills, then also just lifting their heads as islands amid the waste of waters. One of these was here [pointing to the map] south of Lake Superior, another west of Lake Superior, Iron Mountain in Missouri was another, the Ozark Mountains, in Missouri, formed another, there was another here in Lampassas county, Texas, and the peaks of the Apalachian formed a long archipelago. Labrador formed the principal continent, and the most of New England was a detached island.

These were truly the primitive rocks. Twenty years ago all granite rocks, trap, &c., were called primitive, but we now know that granite has been found in all geologic periods. Professor Hutton, of Edinburgh, who first studied the geology of Scotland, finding that nearly all the rocks of that country bore traces of fire, came to the conclusion that all rocks had been formed by heat, and published the Plutonic theory of geology. At about the same time Prof. Werner, in investigating the geology of Germany, the rocks of which country have nearly all been deposited at the bottom of the seas, came to the conclusion that all of the rocks of the earth had been formed in this way, and he published the Aqueous theory. For many years in the world of science a war was waged between the partizans of these two theories. During this time a very humble individual in England, a land surveyor, William Smith, while pursuing his vocation, traveling from one country to another, perceived that certain rocks always contained the same kinds of shells and other fossil remains; and he finally discovered that he could identify rocks, though separated and in different counties, by the fossils which they contained. After prosecuting his investigations for twenty years, and establishing the identity of certain formations which came to the surface in widely-separated localities, he published the result of his labors in a geological map of England. Then a number of young men (they were young then), Charles Lyell, Roderick Murchison, Prof. Sedgwick, De la Beche, Sir William Logan and others, formed the London Geological Society, and resolved that they would have no theory, but would go out into the fields and examine the rocks, and when they had collected a sufficient number of facts, they would then endeavor to interpret them. The result of their labors, and that of other geologists all over the world, has been to confirm the conclusions of William Smith, and the history of geology is now read in fossil remains. We find that certain species of plants and animals lived and multiplied on the earth through long periods of time, and then became extinct, and have never made their appearance since. To give you some faint idea of the labor that has been performed by geologists, more than 25,000 species of fossils have already been described and named.

The solid rocks of the earth form but a very thin crust when compared with the molten mass of the interior, and as the globe cools and shrinks, the crust settles down in some places, raising up other portions or drawing off the water from them. It is moving up and down in constant though exceedingly slow oscillations. A great many times the principal portion of the continent of North American has been raised above the level of the sea and again submerged. At the present time New Jersey and Long Island are settling down, while Newfoundland is rising up. New Jersey has settled about five feet since Count d'Estang anchored his fleet on the coast in 1778.

When rocks are above the sea, they are being constantly worn by the waves, frosts, rains and other denuding agencies, and the matter of which they are composed is being carried into the ocean. When they are beneath the waves, deposits of new rocks are being formed upon them. Hence the lower rocks are, of course, the older. We find always in the lowest and oldest rocks the simplest and lowest forms of both animal and vegetable life. Though the very oldest, the rocks which I have been describing, the Adirondack Mountains and their cotemporaries contain no organic remains. They were formed before the creation of animal life upon our planet. But the rocks which have been formed since their day are composed mostly of organic remains. These have been deposited during successive periods of submergence, to a depth, in some places, as shown by actual and accurate measurement, of more than twenty-five miles! From the fact of their containing no animal remains, the earliest rocks which I have been describing are called the azoic rocks, from the Greek negative, *a*, and *zoe*, life.

What I wish to accomplish this evening is to present a distinct and impressive idea of the condition of the North American continent at the beginning of the geologic record. Labrador and the islands that I have described then raised their rocky and barren heads but a few hundred feet at most above the waves. There were no trees, nor plants, nor birds, nor any signs of life, but the world was a desolate waste. I purpose, in subsequent evenings, to describe the process by which all the other rocks that have been added to the azoic to form this continent have been first laid down on the bottom of the sea and then raised into their present position; accompanying the description with an account of the gradual coming forth of animal and vegetable life upon the earth.

A High Compliment to a Boston Artist.—A gentleman of much learning and taste, who lived many years in Boston and now resides in Europe, having received photographs from several friends here taken by Mr. J. A. Whipple, No. 96 Washington street, Boston, writes that in all Europe there cannot be found any photographs so excellent as those taken by the above named artist, and that all the Europeans to whom he had shown these specimens concurred in the same opinion. Mr. Whipple is unsurpassed in his profession even in this country. We have frequently received specimens from him showing that his skill in the art photographic is justly the subject of high encomium.

Thousands of tuns of coal dust are lying at Pennsylvania coal mines, which are now useless for the want of some mode of reducing it to a state in which it might be rendered valuable as fuel. Such coal dust might be mixed with a small quantity of asphalt, and pressed into square blocks, by which it would become excellent fuel for steamships. Anthracite coal dust can be and is now burned in the furnaces of some of our river steamboats, and when fed in thin layers to the fires, it is found to be as good for generating steam as coal in large lumps. This dust is obtained from coal yards, but that which is lying at the mines may be employed in the same way.

In Southern Illinois, considerable quantities of cotton have been raised this season, and sold to the cotton factory in Chicago. This cotton is pronounced by competent judges to be equal to a good quality of some of southern production.

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ON THE GYRATORY MOVEMENT OF A LIQUID MASS.

We translate the following from the *Presse Scientifique des Deux Mondes.*

After the beautiful hydraulic works of M. Magnus, of Berlin, M. Perrot presented to the Academy, in the month of October, 1859, a note in which he expressed the opinion that the gyratory movement which manifests itself in a liquid mass, while it is running out through a small circular orifice in the horizontal bottom of a cylindrical vase, is an immediate effect of the diurnal movement of the earth. M. Magnus, on the contrary, had attributed the gyratory movement to the perturbation occasioned by a material obstacle or an exterior movement in the convergence of the liquid molecules toward a common center.

M. F. Laroque has just rëexamined the question, and numerous experiments made on a zinc cylindrical vase of larger dimensions than those employed by M. Magnus, have led to the following conclusions :—

First, If there exists near the orifice any obstacles which modify the rectilinear convergence of the molecules toward the orifice in diametral planes, there may result a gyratory movement which changes sensibly the physical constitution of the liquid vein. But this movement propagates itself only to a very short distance from the orifice, and never rises gradually to the surface whenever the liquid is more than about four inches in depth ; nor in any case does it communicate itself to the liquid mass.

Second, During the discharge the liquid molecules do not move from the circumference toward the center—they fall.

Third, In the experiments of M. Magnus and M. Perrot, where they have observed a movement of rotation of the liquid mass, at first sensible at the surface above the orifice, and an instant after the discharge had commenced, this movement had existed before the discharge.

Fourth, The gyratory movement of a liquid mass, during the discharge, observed by M. Perrot, was not an immediate effect of the diurnal movement of the earth.

Discussing afterward the opinion emitted by M. Babinet at the time of the first experiments, that all the rivers of the northern hemisphere have a tendency to the right side, as an effect of the movement of the earth, M. Laroque arrives at this conclusion, that, "In the actual state of science, the flow of liquids cannot render manifest, in any case, the rotary movement of the earth."

Substitutes for Indigo.

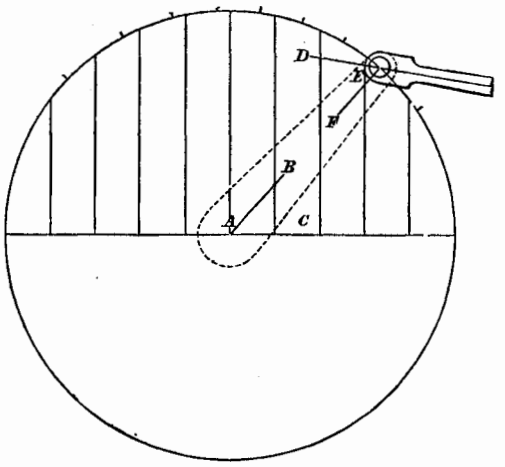
Owing to the scarcity and high prices of indigo and the great demand for dying fast blue woolen cloth and flannel, a cotemporary states that the woolen dyers in Hampden county, Mass., are buying up carrot tops from the farmers, paying at the rate of twelve or fifteen dollars per acre, and using them for dying blue. Carrot tops yield a species of indigo, the same as woad, and they are used in what is called the "pastel-vat." The color obtained from them is as durable, we think, as that of indigo, but it requires a great quantity of them to yield a small amount of coloring matter.

It appears to us that chemists will find what are called "the refuse products of petroleum oils," good subjects for experiments to obtain a rich coloring substitute for indigo. Scarlet, red, crimson, drab, green and blue colors have been obtained from compounds of the aniline, but these are not fast colors. What is wanted is some discovery to render aniline blue a permanent color, and when it is well known that, according to Dumas, a radical salt of indigo is *anyle*, which is composed of C_{16} H_5 N, the manufacture of indigo from coal tar is not a hypothetical proposition.

An Illinois Farm.—The largest farm in Illinois is that of Isaac Funk, who resides near Bloomington, M'Lean county. The total number of acres occupied and owned by him is 39,000—one farm of 27,000 acres, said to be worth $30 per acre, and three pasture fields containing, respectively, 8,000, 3,000 and 1,000 acres. His great crop is corn, all of which he consumes at home, and is thus able to market about $70,000 worth of cattle per year at New York. His stock on hand of horses, mules, hogs and fat cattle is said to be worth $1,000,000.

DISCUSSION OF THE CRANK MOTION.

The Polytechnic Association of the American Institute have been engaged for two evenings in discussing some questions in relation to the crank motion suggested by Mr. Rowell. Mr. Rowell presented a diagram illustrating the motion of the piston and of the crank, and remarked—I wish to present some considerations to show that the theory in regard to the crank motion does not hold in practice. We all understand that when the crank is near the dead point, and the steam is working with a short lever, the motion of the crank is much greater in proportion to the motion of the piston, than when the piston is at half stroke ; so that it may be that as much work is done by the motion of the piston through one foot near the dead point as by an equal motion near the half stroke. The theory is, that exactly as much work is done in one part of the stroke as in another in proportion to the steam used.



Let this circle represent the motion of a crank five feet in length ; the piston of course having a stroke of ten feet. I have divided the diameter in ten spaces, each representing a foot in the motion of the piston, and drawn the ordinates to the circumference of the circle. Now if the connecting rod was of infinite length, so that it would be perfectly horizontal throughout the stroke, the arc between these ordinates would be the space traveled by the crank pin at each foot of the piston's motion ; and this is what the theory supposes. These ordinates are sines of angles at the center of the crank with the crank as radius ; and they measure the length of the lever at each part of the stroke. The theory is, that at any given part of the stroke the motion of the piston is in proportion to the sine of the angle at which the crank stands, which of course corresponds with the length of the lever. In other words, the rapidity with which the steam is being expended is all the time in exact proportion to the length of the lever on which it is acting. This is the theory. But, as I say, it supposes a piston rod of infinite length.

I have marked on the diagram the points in the circle to which the crank would be carried by the motion of the piston through each foot of its stroke with a connecting rod 20 feet in length, and it will be seen that this varies materially from the theory.

Mr. Babcock—The inclination of the connecting rod does not alter the law. The measure of the lever becomes the sine of the angle D E F, instead of the angle B A C ; and this is in proportion to the motion of the piston.

Mr. Rowell—I have made some experiments in turning a crank with a weight, and the weight required to move it near the dead point is so enormous that I am satisfied that the steam let into the cylinder at the beginning of the stroke does no good.

Mr. Brewster—I would ask Mr. Rowell if he supposes there is any loss of power in using a short crank ?

Prof. Mason—Are you an engineer ?

Mr. Brewster—Yes, sir.

Prof. Mason—Do you suppose that there is any part of the stroke in which the steam does not aid the motion ?

Mr. Brewster—No, sir.

Mr. Teufelsdroch—That is not necessarily the case. It may be that for a short space very near the dead point, the pressure will so increase the friction upon the journals of the main shaft as actually to retard the motion.

Mr. Stetson—We all know that there is a space near the dead point when the steam does no good. If we were prying round the wheel with a crowbar we could do it more easily with the steam cut off. The distance to which this space extends depends upon the kind of engine. With the engines of very long stroke and small diameter of cylinder, permitting a small crank pin, the space would be shorter than with such engines as are used in propellers which have cylinders of greater diameter than their length —shaped like cheese tubs. In these the crank must travel through a large angle before the steam could overcome the friction.

Mr. Babcock—The point at which the steam more than balances the friction depends entirely upon the condition of the rubbing surfaces, and not upon the kind of engine. I will illustrate the point by a diagram upon the blackboard.

If the block, *a*, rests upon a level table it will not be moved by any amount of pressure. The block, *b*, resting upon an inclined surface, will slip at a certain angle of inclination. This angle varies with the surface, but does not vary with the weight of the block. The surfaces being the same, it will slip at the same angle whether the block weighs one pound or ten. Each surface has its angle of friction, which is constant with all weights. This law applies to the point under discussion. As the pressure which increases the friction is the same as that which tends to move the crank, the crank with given rubbing surfaces will start at the same angle whatever the form of the engine.

How the British Debt is Held.

It is not generally known to what extent the British funds are held by the poorer classes in Great Britain. The following table, therefore, cannot but be interesting at this time. It is found in a note in the first volume of "Alison on Population," page 127, English edition :—

Table of the holders of property in British funds in 1837, from "Porter's Parliamentary Tables for 1837" :—

			Holders.
Dividend not exceeding	£	5	87,212
"	"	10	45,020
"	"	50	98,759
"	"	100	25,888
"	"	200	14,810
"	"	300	4,493
"	"	500	2,762
"	"	1000	1,359
"	"	2000	402
Dividend exceeding		2000	176

It appears from this table that of the holders of the British debt, 280,881, there are 256,879 who hold an amount drawing dividends not exceeding £100, and that 87,212 hold such small amounts as entitle them to draw less than £5.

A New Cunard Steamer.

We learn from the Glasgow *Herald* that on the 8th ult. Messrs. Napier & Sons launched from their building yard the *China* (screw steamer), belonging to the Cunard line. The *China* is a ship of 2,000 tuns burden. She is to be fitted with oscillating engines of 550 nominal horse-power and patent surface condensers, in addition to the ordinary condensers. The *Herald* says :—

The Cunard company have always exhibited the greatest caution, combined with the highest enterprise, in constructing the vessels intended for their line, and in the present case we have an instance of a vessel fitted up with all the most recent improvements, and yet to provide for the smallest chance of an accident, having on board not only the condensers on the new system, which has generally been adopted to the discardment of the old plan, but those also founded on the former system. The following are the dimensions of the *China* :—Length of keel and fore rake, 322 feet; breadth (molded), 40 feet; depth (molded), 29 feet; extreme length, 346 feet.

This is the first large steamer with oscillating engines built for this company, we believe. The early success of the *Arago* and the later success of the *Adriatic*, American steamers, with oscillating engines, may have led to this style of engine for the new Cunarder.

A Griffiths propeller (illustrated on page 352, Vol. XII. old series of the Scientific American) is used in the *Warrior* iron-clad steamer. It is 24½ feet in diameter; the pitch 30 feet. The indicated horse power of her engines on trial was 5,162 horse, with a steam pressure of 22 lbs. on the pistons.

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CHEMISTRY OF IRON.

Number III.

IRON ALONE.

Having cleared the way to the subject, we now come to iron itself. Of the 66 elements at present known, 49 are metals. Of these, the most abundant and the most useful is iron. The atom of iron is 28 times heavier than the atom of hydrogen. Perhaps a suitable substance to represent the atom of iron, will be iron itself; though the weight, or specific gravity, of a substance is a different thing from its atomic weight. In some substances the atoms are closer together than in others. The Latin name of iron is *ferrum*, and the letters Fe are adopted as its chemical symbol. In chemical formulæ Fe means one atom of iron, Fe_2, two atoms, Fe_3, three atoms and so on.

Iron is seven and seven-tenths times heavier than the same bulk of water. In other words, the specific gravity of iron is 7.7. The specific gravity of a solid that is heavier than water is ascertained by a very simple process indeed. It is only necessary to weigh the body twice, once in the air and once in water. If the body be suspended from the scales so that it will hang in a vessel of water, it will displace a quantity of water precisely equal in bulk to itself, and will be buoyed up, or have its weight reduced, to an extent just equal to the weight of its own bulk of water. If a body weighs in the air 10 lbs. and in the water 8 lbs., it shows that a mass of water equal in bulk to itself, weighs only one-fifth as much; in other words it is five times heavier than water, or its specific gravity is 5.

Iron can be drawn into wire, and is therfore said to be ductile. It can be extended by hammering and is therefore said to be malleable. The several metals vary in regard to the degree of their ductility and malleability, and it is a curious fact that while one metal may be more ductile than another it may be less malleable; and while one metal is extended more than another under the hammer, it is extended less by rollers. Cooke gives the following table of the more common metals, arranged in the order of their relative ductility and malleability; those first named in the several columns being the most ductile and malleable.

Ductility.	*Malleability under the Hammer.*	*Malleability under the Rolling Mill.*
Platinum,	Lead,	Gold,
Silver,	Tin,	Silver,
Iron,	Gold,	Copper,
Copper,	Zinc,	Tin,
Gold,	Silver,	Lead,
Zinc,	Copper,	Zinc,
Tin,	Platinum,	Platinum,
Lead.	Iron.	Iron.

While iron is more ductile than either copper, gold, zinc, tin or lead, it is less malleable than any other of the metals in common use.

Iron is fusible, though it requires a very intense heat to melt it when pure. The melting point of pure iron is stated to be 2,912° above zero of Fahrenheit's scale, though the difficulty of measuring these high temperatures with accuracy prevents us from relying implicitly on these figures. Cast iron melts much more readily, the melting points of the different varieties ranging from 1,742° to 2,282°.

Ice and most other solids when heated to their melting point change at once to perfect liquids; but a few, as wax, glass and resin, pass through an intermediate state, becoming pasty before they become perfectly liquid. This state is called vitreous fusion. Iron belongs to this class of substances; when softened by heat it is said to be in a state of vitreous fusion.

LEAD MINES — PROCESS OF SMELTING.

The deposits of lead ore in America are of vast extent. In Wisconsin, Illinois, Iowa and Missouri, they abound in what is called the "cliff limestone." According to the geological report of D. D. Owen on the Northwestern territory, there are sixty-two townships in Wisconsin, ten in Illinois and eight in Iowa, in which lead ore abounds. This metallic region extends east and west eighty-seven miles; north and south, fifty-four miles. In Missouri, as well as Illinois, the deposits of lead ore are inexhaustible, and the diggings seldom exceed 30 feet in depth. So abundant is this ore in America that 3,000,000 lbs. have been raised from a space not exceeding 50 square yards in breadth in Wisconsin; and 500 lbs. are raised daily by one miner in mines of an average production.

GALENA.

The common name for this ore is "sulphuret of lead." It is generally composed of lead, 86.55 parts; sulphur, 3.45 parts. This is the composition of pure galena, but lead ore frequently contains some iron, arsenic and other impurities. When a small cube of this ore is placed upon a piece of charcoal and submitted cautiously to the action of the blowpipe, it gives off sulphur fumes and yields a globule of lead. Galena is a shining ore of a gray appearance. It is easily recognized, and with a simple blowpipe and an alcohol lamp its quality can be tested in a few minutes.

Lead ore is found in the northern counties of the State of New York (where there were at one period several mines, now abandoned), Massachusetts, Maine, New Hampshire, Vermont, the Lake Superior region and at Monroe, Conn., where a small argentiferous vein occurs containing three per cent of silver. Lead ores also occur in Virginia, Tennessee and North Carolina. In Davidson county, North Carolina, it is very abundant.

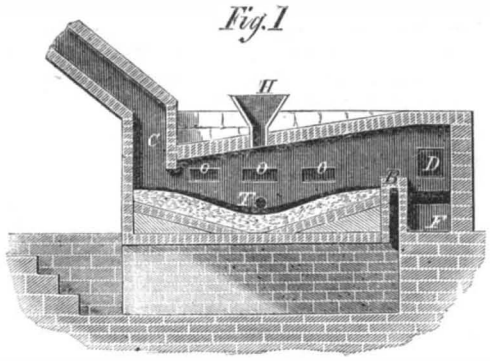
It is remarkable that, notwithstanding our large deposits of lead ore, the home demand for lead in various forms has never been fully supplied from native mines, as the annual importations amount in value to about $2,300,000; and they will perhaps amount to double this sum the present year, large orders having lately been sent to Europe for German and Spanish lead.

Recently several inquiries have been made of us respecting the foreign modes of lead smelting, as it is supposed by some persons that the furnaces and processes in Great Britain are superior to ours, or England would not be able to furnish us with so much lead from ores which are decidedly inferior to those in America for richness in metal; and, beside this, the mines in that country are more difficult to work. We should rather be exporters than importers of this metal.

The following are illustrated descriptions of lead furnaces employed in England; two for smelting the sulphurets of lead, and the other for refining silver lead.

Fig. 1 is a longitudinal vertical section of the most common reverberatory smelting furnace. The sole of

Fig. 1



the hearth is about 8 feet long and 6 feet wide, and is usually formed of fused slag, obtained from the smelted ore itself. About the center of the hearth there is a depression for the fused metal to collect in, and there is an opening to the outside for a tap hole, T, to draw off the smelted metal into a cast iron pan which is set in a niche a little under the side of the furnace. F is the firebox with the bridge wall, B, behind it; C is the chimney. The arch of the furnace is about 14 inches above the fire bridge; at the other end the arch descends to within 6 inches of the hearth, for the purpose of bringing the flame into close contact with the charge of ore. In the center of the arch is an iron hopper, H, for admitting the charge of ore. D is the door of the furnace for supplying fuel and raking the charge. On the same side are three holes, O O O, passing into the smelting hearth. These are covered with iron plates, and are only opened for the purpose of stirring the charge and supplying air as required. There are three such holes on each side of the furnace. The slags composing the sole of the hearth decline toward the tap hole, T. A charge of ore varies from 1,200 to 2,000 lbs., according to the size of the furnace. The charge is spread on the hearth with an iron rake, and, as the smelting proceeds, it is frequently stirred to expose fresh surfaces to the air and heat. After the first charge is smelted in a furnace, and the whole drawn off and the slags cleaned out, a second charge is fed in by the hopper, H. During the first two hours' operation, very little fuel is added, as the furnace retains sufficient heat for the slow action required in the earlier part of the process. Dampers are necessary in the chimney and flues, and the firebox should have one also. These are closed at first; then, after a short interval, a small portion of damper is opened, and the charge stirred with an iron rake. The smelter who has charge of the furnace works in front, and his assistant at the back openings. The first rakes the charge frequently toward the bridge wall, and the second spreads it over the hearth. Quick lime is added occasionally through the hopper to act as a flux and set the metal free. Fuel is added as the furnace requires it, and powdered charcoal or bituminous coal is thrown in among the slag to reduce the oxyd that may be formed. When the reduction of a charge of ore is complete, the lead is drawn off by the tap hole, T, and run into pigs. The whole *shift* in smelting a charge of lead occupies from five to seven and a half hours. Very rich ores require less fuel and less time to smelt than poor ores, and some metallic lead is frequently run off by the tap at an early period of the process.

[Concluded next week.]

Mineral Wealth of the Pacific States.

The wonderful spirit for exploration and adventure, as well as for investigation into the mineral resources of this side of the continent generally, which has prevailed continuously since the Fraser river excitement of 1858, has produced highly important results.

The new mining fields, developed within the period named, in British Columbia, Washington, Oregon, and for hundreds of miles along the eastern borders of the Sierra Nevada, are already giving employment to probably 30,000 people, nearly one-half of whom are in Washoe alone. The amount of silver and gold now finding its way to this city from Nevada Territory is conceded by bankers, and other well informed parties, to fall not far short of $500,000 per month, and $6,000,000 is not an extravagant estimate of the annual yield of Nevada from this time forth, while it will astonish no one if, after a few years, $15,000,000 or more should come to be the average product.

But these large additions to our mining resources do not by any means determine their boundaries. Patient exploration, by experienced miners, continues along the undeveloped borders of more than a thousand miles of mineral country; and the continued discoveries of silver and gold in the Humbolt river region, as well as farther north, on the yet unexplored borders of Oregon and Washington, may almost be taken as evidence that we have as yet only found on edge of the great mineral field of North America.

These extensive developments, during the past three years, are undoubtedly among the principal causes that have created so much confidence and prosperity in this city. While the extent of our mineral resources is so largely increased, and so much greater still in prospective, the discovery of silver, and the greater success attending quartz mining enterprises, have removed many doubts formerly existing as to the permanency of our chief sources of wealth. We now see clearly what could not be so readily proved in 1855, '56, '57 and '58, that there are mineral resources yet to be developed such as cannot fail to make the opportunities for acquiring wealth on this coast better than any where else in the world, even after we can count our population by millions instead of by hundreds of thousands.—*San Francisco Bulletin.*

THE London *Times* says that two of Mr. Lancaster's cast-iron guns, strengthened upon his improved system, have been severely tested during the last few days in the bombproof cell in Woolwich Arsenal, with a view of ascertaining their utmost amount of durability. The improvement consists in the gun being clad throughout with longitudinal layers or bars of wrought iron, hooped over with rings of the same metal. The test is stated to have been exceedingly satisfactory. One of the guns has so far resisted every effort to burst it. The second only gave way at the breech after having been fired several rounds loaded to the muzzle.

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Correspondence

American and English Rifles.

MESSRS. EDITORS :—Permit me to offer one or two comments on the article, in the SCIENTIFIC AMERICAN on page 260 current volume, entitled "American, English and Whitworth Rifles described and contrasted."

In the first place, you give a description of a rifle which you call the Whitworth breech-loading rifle. Now, unless I am in error, the rifle described is simply one of Reeves's (of Birmingham, England,) old patent breech-loaders, made with the Whitworth hexagonal bore. I use the term old patent to distinguish it from Reeves's new patent, which is scarcely yet before the public. Now, if the rifle in question proves to be one of Reeves's, any one would be right in describing Westley Richards's, or, in fact, any other breech-loader, provided it has the Whitworth hexagonal bore, as "the Whitworth breech-loading rifle," which would manifestly be absurd.

You speak also of the "British Volunteer Rifle, (short Enfield,") and say that the caliber is 0.580 of an inch, whereas the caliber of both the long and the short Enfield, as used in the British service is 0.577 of an inch. Your readers have likewise a right to assume that the British Rifle Volunteers are armed exclusively with the short Enfield, which is not the case, for out of 145,000 volunteers I should say that two-thirds carry the long Enfield. Enfield rifles that gage 0.580 of an inch are made expressly for the American market, and that caliber is never used in England.

In conclusion, let me add, that in England, for fine target shooting, we prefer, as you do here, a small caliber, say 0.460 of an inch, or thereabouts, and such rifles we usually load with a patch, provided they are muzzle loaders ; but when prizes are given for volunteers to contend for, then they are required to shoot with the Enfield rifle, because that is the piece with which they are armed, and the object in offering such prizes is to stimulate the men to arrive at the nearest point of perfection in shooting which it is possible to obtain with that weapon. HENRY BUCKLEY,

of Birmingham, England.

New York, Oct. 30, 1861.

[The two English rifles referred to by our correspondent were described from personal observation and measurement. Of course we did not know anything about their makers, except upon information given. We have examined quite a number of English rifles, and have never seen one having a small bore and a heavy barrel, but the reverse. Mr. J. Chapman, author of the "American Rifle," who is a native of England, says "the general characteristics of the English rifles appear to have been, and are at this time, a very large caliber, and a comparatively light short barrel with a quick twist, about one turn in three feet, sometimes using a patch and sometimes not." According to our correspondent, a change may have lately taken place in England in the use of rifles of smaller caliber for "fine target shooting."—EDS.

Glad to Hear It.

MESSRS. MUNN & CO.:—I have just received the long-looked for Letters Patent, and it is really a beautiful document, executed in fine style, and does credit to the source from which it emanated; and allow me here to tender to you our thanks for the faithful and efficient manner in which you prosecuted our business to a successful issue, and rest assured that hereafter whatever business we may have coming within your jurisdiction of attorneys for the procuring of patents, will be intrusted to your care, relying upon your counsel and judgment. We have already been offered an amount for an interest in our patent which will pay us largely for our investment.

W. D. WHALEN.

Northville, Mich., Oct. 29, 1861.

[With reference to the last clause of the above letter, we would state that in spirit it is the same good tidings we are receiving from inventors in other parts of the country. During the period of sixteen years we have been engaged in securing patents we have never known so great a demand for good inventions as at the present time, and scarcely a day passes without hearing of some lucky inventor who has made a cash sale at a liberal price.—EDS.

Concerning the Pittsburgh Student.

MESSRS. EDITORS :—I think you are doing "H. H.," the "poor young man," page 279 of last number, an incalculable injury, as well as all others who may copy his example, by working and studying so many hours per day. He is gradually committing suicide. It is well known that young men generally require eight hours' sleep out of the twenty-four, and few can do with less than seven and not injure their constitution. As many works as now exist on physical education, it is most astonishing "H. H." has not learned this, and still more astonishing that you who do know it, undoubtedly, should not caution him against the rapid destruction of his mental and physical powers.

A.

[No paper has denounced more decidedly than the SCIENTIFIC AMERICAN the cruel and foolish practice of condemning children to long hours of study. We believe that it is destructive to both body and mind, and we regard it as the great sin in the conduct of our schools and colleges. We believe that no practice tends more to obstruct a scholar's progress than over study. But when we see a young mechanic, after his day's work is over, turn to the study of science as a relaxation, instead of spending his evenings in loafing about barrooms, we find nothing to condemn in his course. We admire his taste, approve his judgment, and applaud his resolution ; and the fact that this course is usually followed by great rewards, is, to our mind, an additional evidence of the wisdom of the natural laws of God. Of course moderation should be used in all things, and we should advise our young friend not to injure his health by his studies ; but a person who spends the day in manual labor can bear a great deal more study at night than one who is confined to a sedentary life. Much depends on temperament, and if any of our readers choose to emulate his example, let each one use his judgment in his own case.—EDS.

The Bessemer Steel.

[From the London Engineer.]

Steel, even that of the most expensive kind, is rapidly taking the place of wrought iron in various parts of railway and other machinery. On the Continental railways steel tyres and axles are in extensive, indeed general use. Steel tyres, at nearly £5 ($25) per hundred weight have been largely adopted, also, on various English lines, and cast-steel crank axles, of both Prussian and Sheffield make, are coming into favor, notwithstanding the very high price at which they are sold. Two of the Holyhead and Kingstown steamers have even had cast steel intermediate shafts put in at a cost of £3,000 ($15,000 each), the forgings having been made by Herr Krupp. Cast-steel rails are being made at Sheffield, and sold, in considerable quantities, at £26 ($130) per tun to some of the Continental railway companies. Common Welsh rails, it will be borne in mind, are now quoted at £5 ($25) per tun, and Staffordshire at £7 ($35), and it was thought an enormous price when, two years ago, the Great Northern and other companies were paying £11 10s. ($57) a tun for rails made in Yorkshire, and guaranteed for seven years. The extensive use, therefore, of steel, for the purposes under notice, and at the high prices which it bears, shows the view which engineers and makers of machinery are taking of its merits. If it can be produced as cheap as or cheaper than ordinary wrought iron, it is obvious that steel ships, steel bridges, steel rails, steel boilers, steel shafting, and certainly steel tyres, axles and railway wheels must become the rule, and wrought iron the exceptional materials for such applications. That cast steel may be made at a less cost per tun than wrought iron is now becoming generally known. Just before the gun-making department at Woolwich Arsenal was placed under the charge of Sir William Armstrong, Col. Eardley Wilmot had nearly completed his arrangements for the erection of apparatus whereby he would be enabled to make cast-steel ingots for ordnance at a cost of $7 10s. ($37) per tun. The London and Northwestern Railway Company are, we learn, contemplating the erection of steel works, of a capacity for the production of 300 tuns per week, at Crewe, and the cost of the product can hardly exceed £6 ($30) per tun, inasmuch as the steel is to be made without fuel, except in a cupola for melting, and without manual labor, from pig iron worth less than £3 a tun, the waste being less than in the ordinary puddling of wrought iron. We mistake greatly if the steel rails now made in Sheffield by the "direct process," cost above £6 per tun, notwithstanding that Mr. Brown told the mechanical engineers, during the discussion of his paper at their meeting in Sheffield, that "he did not expect to be able to reduce the *price* below £18 per tun." Even this price would be thought low when steel of but little, if any, better quality, and made by the old process, was selling at £60 and upward per tun. But with the competition, which the production of cast steel, by the "direct process," at one or two other of the great Sheffield steel works, as well as the Tow Law in Durham, and elsewhere, will soon create, we have a right to suppose that a material which can be produced at from £5 to £7 per tun will not command more than £10 or £12 at most in the market. In making cast steel direct from the pig, and without puddling, any desired quality may be obtained. Thus, a steel having 50 per cent more strength than the best Lowmoor iron, with all the toughness of copper, and which will weld perfectly, may be produced at pleasure, as well as a steel having twice the tensile strength of Lowmoor iron, but with the hardness requisite for the finest cutlery. Heretofore the general notion of steel has been that it was too brittle for use in any kind of work exposed to concussion, but if we regard as steel any combination of iron and carbon which may be hardened by immersion, while heated, into a liquid, then we may have steel which not only has greater cohesive strength, but greater absolute tenacity under all circumstances than the best wrought iron. The hardness or toughness of steel depends entirely upon the extent to which it is carbonized, and this extent is under perfect control in the "direct process," any grade of hardness or toughness being as capable of ready production as any one of the various degrees of hardness to which alloys of copper and tin may be be made. For the greater number of applications a tough steel is preferable to a hard steel, and hence the former quality is likely to be in most request. Boiler plates of the most workable quality, and having a tensile strength of 43 tuns per square inch, are now produced in Sheffield at £25 ($125) per tun for all sizes, which is under the average prices of Lowmoor and Bowling iron of the various weights. These steel plates are now successfully used by the Lancashire boiler makers; and the London and Northwestern Railway Company, the Lancashire and Yorkshire Company, and others, including the leading firms of locomotive builders, are now purchasing and using axles, fire box and tube plates, tyres, guide bars and piston rods of the same material. With the reduction of price, to which rapidly-increasing competition must lead, it cannot be long before our railway companies will be able to command, at three-fourths the price of the best wrought iron, a material exceeding it in strength and in most other essential qualities.

[There is a splendid opening for the manufacture of steel by this process in this country. It will be remembered that Bessemer's patent in the United States was set aside in favor of William Kelly, of Eddyville, Ky., who proved that he was the first inventor. Can that patent be bought?—EDS.

A FOUNDRY SWALLOWED UP BY A COAL MINE.—An extraordinary occurrence took place recently at West Bromwich, England. The engineer at the West Bromwich Foundry had scarcely entered the works in the morning when he perceived a peculiar movement of the earth beneath his feet, and almost instantly ascertained that the land on which the engine and works were placed was about to fall into an abyss created by some old workings in an adjoining coalpit. The man's first impulse was to save himself from the impending danger, and he had no sooner run out of the engine house than the earth gave way with a fearful sound, swallowing up in its downward course the steam engine and machinery. A large boiler attached to the engine was left behind among the *débris*, where it remained for some time in an insecure position. The escape of the engineer, the only man then on the premises, was most miraculous.

THE machine for fastening soles upon shoes, illustrated on our first page, is not patented in this country, but we are informed that A. B. Howe, 437 Broadway, has one of the machines on exhibition and will be soon prepared to furnish them for sale.

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INTERNATIONAL EXHIBITION OF INDUSTRY AND ART.

To be held at London in 1862.

The undersigned, having been appointed by the President of the United States, under the authority of Congress, Commissioners to represent the interests of such American citizens as may desire to become exhibiters at the Exhibition of the Industry of all Nations to be held in London in 1862, invite the cooperation of their fellow citizens in carrying out the objects of their appointment.

The articles exhibited will be divided into the following classes :—

CLASS. SECTION I.

1. Mining, Quarrying, Metallurgy and Mineral products.
2. Chemical Substances and Products, and Pharmaceutical Processes.
3. Substances used for Food, including Wines.
4. Animal and Vegetable Substances used in Manufactures.

SECTION II.

5. Railway Plans, including Locomotives, Engines and Carriages.
6. Carriages not connected with Rail or Tram Roads.
7. Manufacturing Machines and Tools.
8. Machinery in general.
9. Agricultural and Horticultural Machines and Implements.
10. Civil Engineering, Architectural and Building Contrivances.
11. Military Engineering, Armor and Accouterments, Ordnance and Small Arms.
12. Naval Architecture, Ship's Tackle.
13. Philosophical Instruments and processes depending upon their use.
14. Photographic Apparatus and Photography.
15. Horological Instruments.
16. Musical Instruments.
17. Surgical Instruments and Appliances.

SECTION III.

18. Cotton.
19. Flax and Hemp.
20. Silk and Velvet.
21. Woolen and Worsted, including Mixed Fabrics generally.
22. Carpets.
23. Woven, Spun, Felted and Laid Fabrics, when shown as specimens of Printing or Dyeing.
24. Tapestry, Lace and Embroidery.
25. Skins, Fur, Feathers and Hair.
26. Leather, including Saddlery and Harness.
27. Articles of Clothing.
28. Paper, Stationery, Printing and Bookbinding.
29. Educational Works and Appliances.
30. Furniture and Upholstery, including Paper Hangings and Papier Mache.
31. Iron and General Hardware.
32. Steel and Cutlery.
33. Works in Precious Metals and their Imitations, and Jewelry.
34. Glass.
35. Pottery.
36. Manufactures not included in previons classes.

SECTION IV.—MODERN ARTS.

37. Architecture.
38. Paintings in Oil and Water Colors and Drawings.
39. Sculpture, Models, Die-sinking, and Intaglios.
40. Etchings and Engravings.

Prizes in the form of medals will be given in sections I., II., III., but none in section IV.

Persons desirous of contributing must have their articles entered without delay, and accepted, as all articles, if to be sent by public conveyance, must be ready for shipment at New York by the 1st of January, 1862. A brief description of the articles will be required, with the space they will probably occupy. The articles to be exhibited in sections I., II., III. must have been *produced since* 1850.

Articles intended for exhibition in section IV. (fine arts) are referred by the Commissioners to a special committee of their own number, consisting of the Hon. Edward Everett, of Boston, Robert B. Minturn, Esq., of New York and Eli Whitney, Esq., of New Haven, to whom artists will address their communications.

Application for admission of articles for exhibition must state the section and clause under which such articles would come, and the space or area, in square feet, required for placing or hanging the same.

The applications for the entry and reception of articles may be made to the chairman of the Executive Committee at Washington or to either of the Commissioners or Agents named below, who will forward the necessary papers to be executed by the applicant. Particular attention is called to the requirements of her Majesty's Commissioners. The following is the requirement in relation to entries from foreign countries :—

Her Majesty's Commissioners will communicate only through the Commission which the government of each foreign country may appoint; and no article will be admitted from any foreign country without the sanction of such Commission.

No article, therefore, from this country will be admitted by her Majesty's Commissioners to the exhibition unless they shall be approved or authorized by this Commission; nor will any Agent, Representative or Commissioner, other than such as may be appointed or accredited by this Commission, be recognized by them.

It is expected that a vessel will be furnished by the government for conveying to London and return, free of charge, the articles entered and approved for the exhibition.

The importance of our country being fully represented at this exhibition is most manifest. Since the exhibition of 1851, the improvements in this country in implements, machinery and manufactures have, it is believed, been important; and it is a duty we owe to ourselves, as well as to the countries of the Old World, that these improvements should be exhibited for the benefit of all. We trust that in this respect we shall not be disappointed.

The undersigned make their appeal to their fellow citizens in full confidence that our country will be properly represented in this Great Exhibition.

As soon as the entire regulations adopted by her Majesty's Commissioners are received, they will be published and furnished to all who may desire them.

WM. H. SEWARD,	CALEB B. SMITH,
EDWARD EVERETT,	ROB'T B. MINTURN,
JOSEPH HENRY,	J. H. KLIPPART,
JAMES R. PARTRIDGE,	G. D. COLEMAN,
B. P. JOHNSON,	R. WALLACH,
W. W. SEATON,	ELI WHITNEY,

J. C. G. KENNEDY.

Washington, October 15, 1861.

Names of Commissioners and Agents who may be addressed by persons desiring to exhibit :—

Edward Everett, Boston,
Eli Whitney, Esq., New Haven, Conn.,
R. B. Minturn, New York,
B. P. Johnson, Albany, N. Y.,
J. H. Klippart, Columbus, Ohio,
J. R. Partridge, Baltimore,
G. Dawson Coleman, Pennsylvania. } *Comm'rs.*

J. W. Hoyt, Madison, Wis.,
David Davis, Bloomington, Ill.,
J. W. Hearney, Ladoga, Ind.,
Jas. H. Baker, St. Paul, Minn.,
R. Lowe, Iowa,
Leland Stanford, San Francisco, Cal.,
Jacob M. Howard, Detroit, Mich. } *Agents.*

EXECUTIVE COMMITTEE—Office in the Department of the Interior, Washington (No. 10 Patent Office Building) :—

B. P. Johnson, Chairman, Prof. Joseph Henry,
J. R. Partridge, Sec., W. W. Seaton,
J. C. G. Kennedy.

The Oil Trade.

Many who read the accounts of oil wells in this and other States, says the Philadelphia *Ledger*, are perhaps curious to know whether the business of procuring coal oil in this way is profitable or otherwise. A recently-published statement shows that the amount of this oil transported to a market over the Western Division of the Philadelphia and Erie Railroad during the past months of 1861 had greatly and progressively increased over the quantity transported over the same route during the corresponding period of last year. The editor, however, of the *Rural Argus* (a paper published in the western part of the State) has recently visited the oil regions, and gives the result of his observations in a late issue of his journal. Among other remarks, he says that the price of oil is so low that nothing short of a flowing well will pay. And even a flowing well, he asserts, may endanger the financial standing of its owner by compelling him to incur great expense in the purchase of barrels before any return can be had. He adds, moreover, that innumerable troubles attend the business at every stage of its progress. A few have made themselves rich by it, and a few more will do the same thing; while a vast majority of those who have invested in it, and who will yet do so, will, it is thought, never realize one per cent on the investment. The rapid increase in the expenditure and consumption of this oil would seem to give a contradiction to this conclusion. If some can make fortunes at the business, others, under like circumstances, can do the same thing.

Storing Potatoes.

The following are a few very useful and timely hints on this subject from the *Scottish Farmer* :—Before the appearance of the disease in 1845, it was quite common to store potatoes in large masses in houses. The roots would often keep sound in this state through the greater part of the winter. No fermentation was induced, and any little heat generated had the effect of causing the roots to sprout. Since that time, however, things have been entirely changed. In 1845 the larger portion of the crop was taken up to all appearance quite sound; but whenever it was stored in large pits or in houses a destructive fermentation was induced, which speedily reduced the roots to a rotten mass. It has been observed that thunderstorms seem to stimulate the latent seeds of the disease, and promote first the distruction of the haulm and then that of the tubers.

It has been found that putting together potatoes in large quantities has often had the effect of spreading the taint through the whole. For this reason it is seldom that they are now stored in houses. The smaller the quantities that can be put together the better, as it will diminish the risk of their spoiling. The narrower, therefore, the pits are made so much the more chance is there of the roots keeping through the winter, and not sprouting prematurely in spring.

It is far from advisable to begin to store before the weather becomes cool, as heat is very apt to spread the destructive taint.

White Tanning and Glove Making in France.

White tanning, which is essentially connected with glove manufacturing, as it supplies material to the latter, has been honored by the Paris Academy with a comprehensive statistical description. According to their estimate, the number of white tanners in all France amounts to 6,000, and of glove makers to 50,000, and by the combined trade at least eight million francs are brought into circulation.

We state as a comparison, that seventy years since there were ten glove manufactories in Grenoble, producing about 8,400 dozen pairs of gloves annually; at present over 150,000 dozen are made in that city, and this figure does not represent the eighth part of the quantity consumed in France, without counting the 120,000 dozen which are exported to England alone every year. By comparing the quantity and value of these goods in the past, with those of the present, we become convinced of the gigantic progress that has been made in our trade.

In the year 1765, the French white tanners used only domestic skins; now they import skins from Italy, Spain, Germany, Switzerland, Denmark, Russia and even from transatlantic countries. Glove making was first carried on at Grenoble, and white tanning at Blois and Vendome; the prices of skins in those places have risen so high, that only the most celebrated manufacturers can stand against competition.—*Shoe and Leather Reporter*.

Steam versus Mule Power on Canals.

The Philadelphia *Ledger* states that during "the past seven months an interesting experiment has been in progress, on the Susquehanna Canal, to test the cost of steam power applied to canal boats, as compared with mule or horse power. The boat used is 85 feet long, 16 feet wide and 6 feet deep, with a capacity of 85 tuns, exclusive of her machinery. She has two steam cylinders, each 10 by 12 inches, one upright boiler, and her propeller, of four blades, is 45 inches in diameter; the whole costing $600. The time occupied for the experiment was from the 22d of November, 1860, up to October 1, 1861, and during this time she made sixteen and a half round trips from Wrightsville, twelve of them being to Philadelphia, two to New York and two to Baltimore, and on each trip towing a barge with a capacity of 112 tuns The two boats have transported downward freight, in sixteen trips, to the amount of 2,806 tuns—averaging 175 tuns per trip. The upward trips amounted to 806 tuns. The engine consumed, during the seven months 96 tuns of coal, averaging 40 lbs per mile run, at a cost of $3.45 per tun. The total expenses for the period named, which include wages, insurance, wear and tear, barges, incidentals, &c., was $649.63, while the expense of a single boat, moved with a team of three mules, is $1,723. By adding the capacity of the barge for freight to the steamboat, it shows a saving of $365.62 in favor of steam. An objection was urged to the use of steam, for fear the canal banks would be injured, but so far the experiment shows that no such result has followed; on the contrary, it is said the canal is deepened by the action of the propeller, which stirs the mud up and throws it toward the banks. The Susquehanna Canal, from Havre de Grace to Columbia, Pa., has locks of sufficient length to pass boats of 200 tuns, and an effort is being made to get the canals above and connected with this to lengthen their locks so that steam power may be used the entire distance to Wilkesbarre.

Ventilation of Ships.

Messrs. Silver and Moore, says *Mitchell's Steam Shipping Journal*, have patented a new method for ventilating the between decks of ships. Having made sundry experiments, they discovered that foul gases descend. To carry them upward, therfore, a downward and upward draught was necessary. This they have managed by opening trap valves in all the decks below the spar deck. These apertures are protected by the insertion of a round iron grating. The valves under the decks spread the air or gases, and help in the down draught, and they are made self-acting, so as to close in the event of water filling the compartments of the hold, and thus stop its passage above the lower deck. To carry off the gases and all foul air from the hold, pipes are let down through all the decks to within a few feet below the lower deck. The upper parts of these pipes are conically shaped, to create a current of air. The gases are carried up, naturally, by this up draught, and pass away above the bulwarks. By this simple contrivance the patentees maintain that they can keep the between decks free from impure air and foul smells, for, as the pure air passes down the hatchways, it carries with it the gases to the hold, and thence by the up pipes to the spar deck. The smell from bilge water and offensive cargo would be considerably lessened by this mode of ventilation. The principle, we understand, is about to be adopted in France, in theatres and hospitals, and is to be tried in ships.

THE *Cincinnati Gazette* says that on looking over the list of subscribers to the national loan, it is surprised to see that none of the names of prominent government contractors appear in it.

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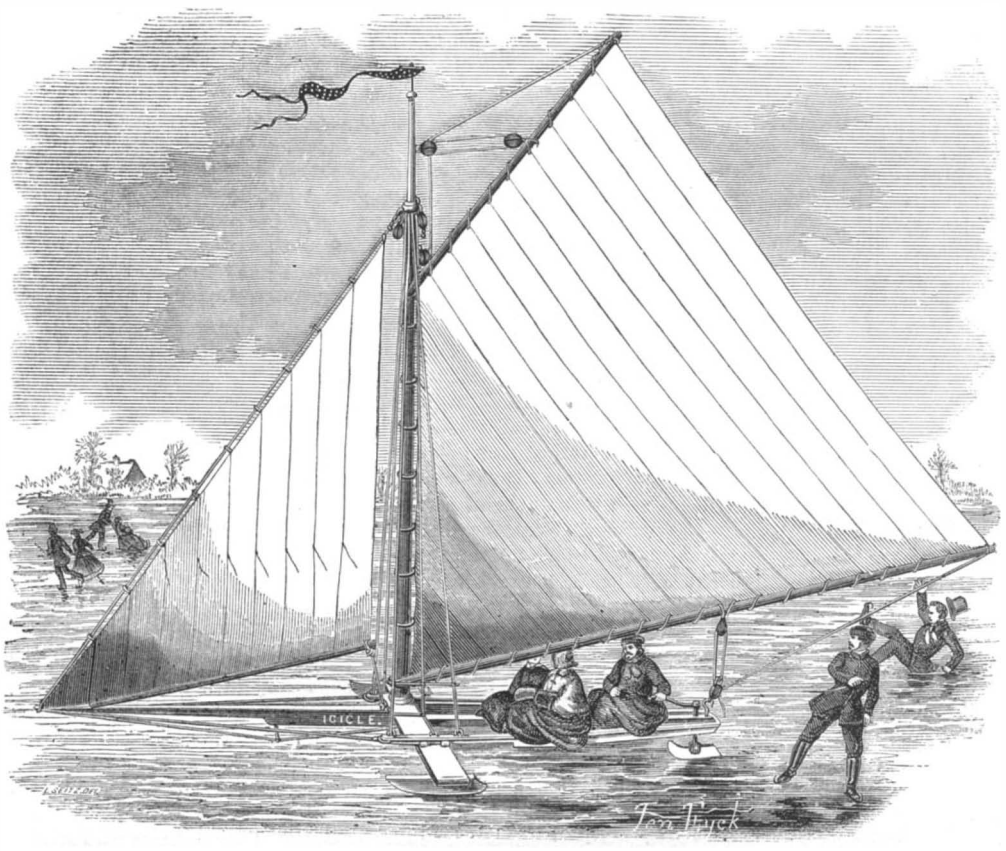
Sailing on the Ice.

Harriet Martineau says the most delightful physical sensation that she ever experienced is that of rapid motion through space. We advise Miss Martineau to try an ice boat. By this means she will not only obtain a motion of the greatest possible rapidity, but one that is peculiarly exhilarating. In traveling in a rail car, not only is the course confined rigidly to the prepared track, but there is such a mass of matter rumbling along with the traveler, that the speed is not fully realized. In an ice boat you slide across the broad fields of ice with the speed of a dried leaf driven before the wind, and the direction of your motion is under your most perfect control. With a slight turn of the rudder you change your course at will, now cutting sharply into the wind, and now sweeping along with it as if you were a portion of the storm.

This most exciting sport has received its fullest development on the Hudson River, and in the towns along the banks great rivalry exists in the construction of boats for the races which are constantly occurring during the winter season. Our engraving is from a photograph of one of these boats furnished us by Mr. Stevens of Poughkeepsie. The Hudson River ice boats are all made on the same general plan. A light triangular frame, 12 feet in length, rests at its forward end upon a transverse plank 12 feet long, which is supported at its ends by two short runners. The rear end of the frame, forming the apex of the triangle, rests upon a third runner, which is fitted to be turned like a rudder by means of a helm. The sailor, wrapped in fur robes, reclines upon the frame, and flies away over the ice in any direction at will, almost literally with the speed of the wind.

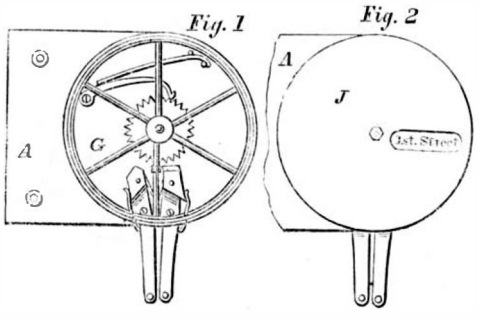


HUDSON RIVER ICE BOAT.

The races among the ice boats on the Hudson, have been for the last two winters the most prominent subject of interest and excitement among the inhabitants from Cold Spring to Troy. They take the place here of the yacht races in England; though a yacht race is a sluggish and stupid affair compared with the arrow-like flight of a fleet of ice boats.

STREET AND STATION INDICATOR FOR RAILWAY CARS.

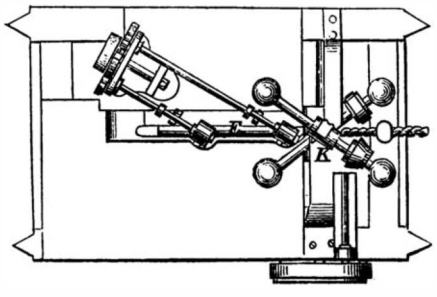
It is a source of constant annoyance to persons riding in city railway cars to be keeping a perpetual lookout for the streets at which they intend to stop. The same perplexity is experienced by persons traveling on extended lines of railways in watching for the several stations, especially if the conductor (as it not unfrequently happens) is somewhat husky in voice and shouts out the name of each station in an "unknown tongue."



The accompanying figures represent a front and back view of one of the many simple devices, which have been patented, for obviating such trouble. It is a Street and Station Indicator, having an interior dial with the names of the streets or stations that are to be passed, upon it, and a front plate, J, with a slit in it showing that "First Street" is the next one at which the train will pass. This indicator is secured to the car, A, in a conspicuous position. G, Fig. 1, is the back part of the movable index plate which has a ratchet wheel upon it, the teeth of which take into a spring pallet to hold it in the required position. When the car has passed "First Street," for example, the conductor moves the index plate one notch round by one of the hanging handles, so as to bring "Second Street" before the slit, and so on until all the streets or stations are passed. In returning, the second handle turns the index plate in the reverse direction. By looking at such an indicator every person may know the station and street at which the car is next to arrive. Patented February 7, 1860, by Adolph H. Rau, of Philadelphia.

CUTTING SPIRAL MOLDINGS.

"Rope moldings" are used extensively for architectural decoration, and such "beading" is frequently turned on various articles of household furniture,



such as work-stand and table legs. Such spirals may be turned on a lathe with a slide rest in the old fashioned way, but this involves a very tedious operation.

The accompanying figure is a plan view of a machine for turning "rope moldings" with two cutters acting at the same time, and the improvement consists in employing feed rollers and cutter heads, K, arranged obliquely with the stick, E, the rollers being operated so as to give both a rotary and a longitudinal forward motion to the stick while the cutters are acting on it. The two top oblique-fluted feed rollers are shown pressing upon the stick, E. The gearing at the back end gives them a rotary motion, feeding the stick forward to two cutters, K; which are contained in a double cutter head, and the forward end of the stick is forced through a guide, as represented. A small and a large feed roller, the one placed lower than the other, act upon the stick behind in such a manner as to rotate and feed it forward at the same time.

Patented January 10, 1860, by C. B. Rogers, Norwich, Conn.

Magnetic Electricity and Gold Amalgamation.

In amalgamating the gold o crush ed quartz, it is said that a considerable quan tity of the very finely subdivided particles are floated off without ever being brought into contact with the quicksilver. To make amalgamation with such fine gold dust practicable, magnetic electricity has lately been applied in San Francisco. The current of electricity is generated in a magneto-electro machine driven by the steam engine which operates the crushers, and the current is sent through the mercury in the amalgamating trough. It is stated in our California exchanges, that the current of magnetic electricity increases the affinity of the mercury for the gold, and enables it to take up a larger quantity of it from the washings of the quartz.

Lowering Boats at Sea.

One of the English companies owning a line of steamers plying between England and France having decided to supply their vessels with apparatus for lowering boats at sea, have commenced a series of experiments to determine which is the best plan. At a recent trial of Clifford's invention on the steamer the *Maid of Kent*, while the vessel was rushing through the water at the rate of fourteen knots an hour, the twenty-five foot lifeboat, with the crew in it, was lowered and cast off by one of the crew only with perfect ease and safety.

AMERICAN SALTPETER.

A correspondent of the Philadelphia *United States Gazette* states that saltpeter may be manufactured in the States of Tennessee, Alabama, Kentucky and Arkansas from the nitrous deposits collected in caves. The crude material of which it is made is a greasy, tough yellow clay, having a saline taste. The caves in which it is found are very irregular, and those who gather the earth carry torches to light up the rocky passages. The best deposits are found in narrow crevices, and dry localities among the rocks where there are strong currents of air. There are also large banks of carbonate of lime deposits in these caves which are entirely destitute of niter; it therefore requires considerable practice in selecting the crude material. There is one establishment on the White river, near Batesville, Ark., which was erected by parties from New York, in which 1,000 lbs. of saltpeter are stated to be produced daily. During the Revolution saltpeter was manufactured in considerable quantities at the Mammoth Cave, in Kentucky. Most of our saltpeter is obtained from the East Indies.

CAUTION ABOUT BUILDING IRON-CLAD SHIPS.—The *Army and Navy Gazette* (British) states, that while England is busily engaged in converting some of the timber war steamers of the navy into armor-plated vessels, after the pattern of the French frigate *La Gloire*, the French have actually abandoned the plan, and are building all their vessels solely of iron. It is said that this step is the result of experience gained by trials with *La Gloire*. Her timbers have been found unable to bear the weight of the armor, and strain of the broadsides fired from the heavy artillery of her batteries.

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☞ See Prospectus on last page. No traveling agents employed.

VOL. V. NO. 20.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, NOVEMBER 16, 1861.

FIFTEEN THOUSAND PATENTS SECURED THROUGH OUR AGENCY.

The publishers of this paper have been engaged in procuring patents for the past sixteen years, during which time they have acted as Attorneys for more than FIFTEEN THOUSAND patentees. Nearly all the patents taken by American citizens in FOREIGN countries are procured through the agency of this office.

Pamphlets of instructions as to the best mode of obtaining patents in this and all foreign countries are furnished free on application.

For further particulars as to what can be done for inventors at this office, see advertisement on another page, or address MUNN & Co.,

No. 37 Park-row, New York.

BRITISH AND AMERICAN IRON-CLAD SHIPS OF WAR.

The British papers contain glowing accounts of the trial of the *Warrior*, the first armor-clad frigate built for the British navy. This vessel is of 6,500 tuns capacity, and her engines are said to be capable of working up to 6,000-horse power. Her broadsides are covered with 4½-inch iron plates; on the center of the spar deck is a shotproof tower for riflemen, and she carries a small cupola for melting iron to fill shells with molten metal. This is the new method of making red hot shot. The armament of the *Warrior* consists of thirty-four 68-pounders (smooth bore) in the broadside ports, two 100-pounder Armstrong rifled pivot guns on the upper deck—one forward and the other aft; also, three 40-pounders, two 25-pounders, a 26-pounder and a 6-pounder Armstrong, and a 24-pound brass howitzer, all on the upper deck. With 650 men on board, coals, water and full equipment, she drew 25 feet 9 inches of water forward, and 26 feet 3 inches aft, and obtained a speed of 16½ knots per hour. She has proved herself to be the fastest large war vessel afloat, as she is no doubt the most powerful.

The keel for a new iron-clad gunboat was laid at the Continental Works, Greenpoint, L. I., on the 30th ult. Her length, it has been stated, is to be 175 feet; breadth, 40 feet; depth, 12 feet. Above the water line, and to a short distance below it, she will be covered with 6-inch wrought iron plates, and under this with plating ⅝ths of an inch in thickness. She is intended to carry the largest size of Rodman's guns, two of which are to be placed on deck on a revolving fort covered with 8-inch plates.

The Philadelphia *Ledger* states that Messrs. Merrick and Son, of that city, have also received a contract from government to build an iron-clad frigate of 3,500 tuns, which is to be completed and ready for sea in eight months. Her length is to be 240 feet; breadth of beam, 58 feet; depth of hold, 20 feet. The iron plates for this vessel are to be 20 feet long, 18 inches wide and 4½ inches thick, and her armament is to consist of sixteen of the largest size of rifled guns.

Counting the Stevens floating battery at Hoboken (the parent of iron-clad ships), the iron-clad gunboat being built by Messrs. Stevens at Bordentown, N. J., and the mailed gunboat now building at Mystic, Conn., we have no less than five iron-clad ocean war vessels in progress of construction, beside several iron-plated river steamboats on the Mississippi. We are therefore making considerable progress toward securing an iron-clad navy, although, with but one exception, perhaps, none of these vessels will be first-class; still they may prove very efficient, and answer all the purposes demanded by the exigencies of the times.

In connection with this subject, the Boston *Commercial Bulletin* strikes a chord which excites some mental vibrations of an unpleasant nature. It states that Mr. Donald McKay has been the only practical shipbuilder who has directed public attention to the building of iron-clad frigates in America, and he embodied his ideas in a practical form after a careful inspection of the French and English iron-clad vessels. He made a model of an iron-clad frigate and submitted it some time ago, with full specifications, to our naval authorities. "His model," says the *Bulletin*, "was an improvement upon all that he had seen abroad, and those qualified to form an opinion spoke unhesitatingly in its favor; but, for reasons unknown to us, our Navy Department ignored his designs, and gave the iron-cased vessels to other parties to construct." The reason for this course we can perhaps explain satisfactorily. The Navy Department advertised for designs to be submitted for the building of two or three iron-clad vessels, as noticed on page 123 of the present volume of the SCIENTIFIC AMERICAN, and those who submitted specifications in accordance with that advertisement, we have been informed, were awarded the contracts. Nevertheless, it is to be regretted that the government has not availed itself of the ripe experience of Mr. McKay, as it is well known that he made two long sojourns in Europe for the purpose of inspecting the French and British dockyards, and he was admitted into the naval arsenals of those Powers and obtained information respecting the building of iron-clad and other war vessels which no other man in our country possesses.

In connection with this subject, we would suggest that several of our States—especially Massachusetts, New York and Pennsylvania—each build an iron-clad frigate and present them to the Federal government. The States have furnished arms and ammunitions for the army; let them now do something for the navy; and what can they do more to the purpose than build several iron-clad war vessels?

BLUE ARMY CLOTH.

Considerable feeling was lately manifested by woolen manufacturers in Boston on account of some large orders which had been given by the Adjutant-General U. S. A. for English army blankets. They protested against sending abroad for such goods, and it was asserted the mills in New England were capable of supplying all the demands of the War Department. This may be true with regard to the capacity of our blanket woolen mills, but unless our military regulations be changed we shall yet have to send to England for large supplies of army cloth. It is well known that dark blue is the chief color required for the coats of the officers and privates of the army and navy, and we do not overstate the number when we say there are not far from six hundred thousand men now wearing military uniforms. The amount of dark blue cloth for equipping this great host will be about four and a half million yards per annum, allowing three coats to each man. This is not putting the allowance too high for men engaged in hard warfare, especially when it is also taken into consideration that a large portion of the army must also be furnished with dark blue overcoats. Can our manufacturers supply this large quantity of cloth? We believe they cannot; and we think they have never manufactured the finer qualities of army cloth. In conversation a few days since with a customer clothier who frequently furnishes suits for many of the highest officers in the regular army, he informed us they always wanted the best cloth, such as maintained a fresh appearance from the day it was put on until it was worn threadbare. The West of England blue broadcloth was usually selected as possessing this quality. Beside the blue coats required for our army and navy, the officers wear dark blue trowsers, and so do the entire cavalry. The color of the trowsers and overcoats of the infantry soldiers, who are clothed in the United States' uniform, is also blue, but its tone is quite light. For the entire annual equipment of our army and navy in uniform, we may safely allow one-half the quantity of cloth for trowsers that is necessary for coats, thus making the total six and three-quarter million yards of indigo-blue cloth.

Our manufacturers, we are told, cannot obtain a sufficient supply of indigo to dye the amount of wool required for one-half this amount of cloth. Never before have we required so much of this coloring material, and never before was the supply so limited, the stock of the finer qualities being nearly exhausted. A dealer in indigo told us a few days since that he could sell fifty cases of it for every one he has on hand or can get. The East India crops of Bengal and Manilla indigo were greatly reduced last year by disturbances among the cultivators, and the crops in South America were unusually light. These facts and circumstances lead us to conclude that we shall yet have to send to England, which commands such a large share of the world's indigo crop, for very large stores of indigo unless our military regulations are greatly relaxed so far as they relate to permanent colors. We have no hesitation in asserting that durable dark blue colors can be dyed with logwood. They will withstand exposure until the uniforms are worn out, and this should be satisfactory. Such colors are dyed by several "boiling dips" alternately in a weak mordant of sulphate of iron and a bath of logwood until the proper tone is received, then finished with a very weak liquor of blue galls. The color thus obtained will be as permanent as that of common black felt hats, which is well known to withstand sunlight and rain for a long period.

A blue color can be dyed, with logwood, upon wool with a variety of what are called "mordants." By preparing the wool with a sulphate of copper solution, then dyeing it in a logwood liquor, a blue color is obtained which, when new, is not unlike that of indigo, but it is photogenic, and soon fades when exposed to the action of sunlight. A very beautiful dark blue can also be dyed on wool with the prussiate of potash, the muriate of tin and a minute quantity of the nitrate of iron; after which logwood is applied to render the tone deep and rich. However pleasing this color may appear when new, it fades when exposed to sunshine and moisture. A mordant composed of the bichromate of potash and crude tartar makes a very good blue with logwood, but the sulphate of iron and logwood blue is the most tenable color. A logwood blue is neither so beautiful nor so permanent as the color obtained from alkaline indigo, still it will answer every purpose for common army clothing, and effect a saving of at least a million of dollars to the country.

DIFFICULTIES IN CONDUCTING A PAPER—CONTRIBUTIONS WANTED.

A music teacher once wrote that the "art of playing on the violin requires the nicest perception and the most sensibility of any art in the known world." Upon which an editor comments in the following manner:—"The art of publishing a newspaper and making it pay, and, at the same time, have it please everybody, beats fiddling higher than a kite."

It is the ambition of all editors to make their paper interesting to all their subscribers, but owing to the different tastes of their readers, one of the most trying things an editor has to decide is the subjects upon which to write.

A theme with which one person will be exceedingly pleased, another reader, possessing a different taste, will fail to appreciate, while he may be exceedingly interested in some article which the first will entirely overlook, or, having read it, will pronounce it stupid. Thus it is not only difficult but impossible for the conductor of a journal of any considerable circulation to edit it so that every article shall be read with equal interest by all its patrons.

In conducting this journal, it is the aim of the publishers to present as great a variety of useful matter as possible in every number; and, to this end, we solicit contributions from persons engaged in mechanical pursuits, or who, by chance, or study, have made new discoveries in the chemical, electrical, astronomical or geological departments of science.

A GOLD inkstand valued at $3,500 is to be sent from Australia to the great exhibition of 1862.

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VULCANIZING INDIA RUBBER.

The vulcanizing of india rubber is the mixing of sulphur with the gum, and exposing the mixture to a temperature of 270° Fah. This process effects a material change in some of the properties of india rubber, enabling it especially to bear a much higher heat without being destroyed. It is supposed by chemists that the vulcanizing process decomposes the gum, and forms a new substance, one of the elements, the hydrogen, being driven off and its place supplied by the sulphur. Many organic substances are subject to a similar change, the removal of the hydrogen and the substitution for it of some other element or compound. In a long series of substances, hyponitric acid (N. O_4) will take the place of hydrogen. In vulcanizing, the gum and sulphur must be first very intimately mixed mechanically, and then heat effects the chemical change, driving off the hydrogen and inducing the other elements to combine with the sulphur in its place. This application of heat was Goodyear's great discovery, which gave him his fortune. Sulphur and india rubber had been mechanically mixed before he began his experiments.

Sometime ago Mr. Parkes, of Birmingham, England, discovered that if the chloride of sulphur is dissolved in a suitable liquid, and the solution is applied to india rubber at ordinary temperatures, or with very moderate heat, it will penetrate the gum and vulcanize it. It is supposed by chemists that the same change is effected in this case by the chlorine as in the other by the heat. Chlorine has a strong affinity for hydrogen, and it combines with it and passes off in the form of gas, leaving the sulphur in its place. If this theory is correct, Parkes's process produces precisely the same substance as Goodyear's and without the employment of heat. Mr. Parkes uses the sulphide of carbon as a liquid in which to dissolve his sulphur. A modification of Mr. Parkes's plan has been patented in this country, and has been for some time in operation in the neighborhood of Boston. The absence of heat in the process permits it to be employed in vulcanizing very thin sheets, and especially sheets of various colors, which cannot be done by the Goodyear process.

We learn from *Le Génie Industriel* that M. Gauthier de Claubry has recently made a communication to the French Academy of Sciences, in which he states that the hypochlorite of lime and sulphur may be used in place of the chloride of sulphur employed by Mr. Parkes. He says that if sulphur and the hypochlorite of lime are mixed, with the sulphur greatly in excess, care being taken not to pound or rub the mixture, and it is added to india-rubber paste, either at ordinary temperatures or at a mild heat, objects of any thickness may be obtained uniformly vulcanized.

We would ask M. Claubry if the water—always present in the hypochlorite of lime—will not decompose his chloride of sulphur, and thus prevent the reactions which he describes?

NEW LINE OF MAMMOTH ATLANTIC STEAMERS.

"The Transatlantic Express Steamship Company" is the name of a new association recently organized in Bristol, England, to establish a new line of steamers to run between that port and New York. The steamers to be built for this line are to be improved *Great Easterns*, and they are promised to make passages in less than seven days. Each steamer is to be 600 feet in length, 75 feet in breadth and 30 in depth from the upper deck to the keelson. Three watertight longitudinal bulkheads are to run from stem to stern; and with cross bulkheads, the ship will be divided into fifty water-tight compartments below the load line, thus converting it into a huge cellular structure of great strength. There is to be a grand saloon 500 feet in length on the spar deck, and the main and orlop decks are to be fitted up with 836 state rooms. The nominal horse power of the engines are to be equal to those of the *Great Eastern*. The total displacement of each vessel will be 8,000 tuns, and it is intended that the draft of water will only be 18 feet, to obtain small submerged cross section in order to secure great speed. It is set forth by the proposers of this line of steamers that an average speed of 17 miles per hour will be maintained between Bristol and New York, and at this rate voyages will be made in six days at most.

The people of Bristol, we trust, have awakened out of a Rip Van Winkle sleep on the subject of their Atlantic commerce. At one period Bristol was a greater seaport than Liverpool, and her citizens exhibited the most laudable enterprise and public spirit in the beginning of ocean steam navigation. The *Great Western*—the true pioneer of steam navigation between England and America—was a Bristol steamer, and so was the *Great Britain*, the first very large iron steamer. The Scotch engineers, however, have run the Bristol navigators off the ocean course, inasmuch as they have built all the Cunard steamers, and they, indeed, control the steam navigation of the Atlantic.

As Bristol is the nearest large port in the British Isles to New York, and as it is but a short distance from London compared with Liverpool, we would not be surprised if her citizens were to win back their trade from Liverpool, which port has of recent years engrossed mostly all the steam commerce of the Atlantic.

Artificial Alizarine—the Coloring Matter of Madder.

The following is the substance of a paper from the *Comptes-Rendus*, which was read by M. Dumas for its author—M. Z. Raussin—at a late meeting of the Academy of Sciences in Paris:—

Binitronaphthaline is a fruitful source of coloring products. The action of sulphides and protosalts of tin, dissolved in caustic potash, cyanide of potassium &c., yields with this substance very rich red violet, and blue derivatives. When the reducing agents are acids, as, for instance, when a mixture of zinc and weak sulphuric acid is employed, or iron filings and acetic acid, minute grains of tin and hydrochloric acid, &c., the binitronaphthaline undergoes no alteration.

By making concentrated sulphuric acid react on crystallized binitronaphthaline, no reaction is produced. When the temperature of the liquid is raised to 250° C., binitronaphthaline dissolves completely, as soon as the liquid becomes amber color. Only after long boiling will concentrated sulphuric acid begin to react on this substance. If powdered madder root is treated by concentrated sulphuric acid at 100° C., all its organic materials are carbonized. Only one among them can resist this violent treatment, and that is the coloring matter of the root itself—namely, alizarine. Now, all chemists know that the formula of the latter substance, as well as its principal properties, denotes that probably it belongs to the naphthalic series.

The formula of alizarine is generally represented by $C_{20}H_6O_6$; that of binitronaphthaline by $C_{20}H_6(NO_4)_2$. An opportune reducing agent, which, by carrying off two molecules of oxygen, and making nitrogen pass to the state of ammonia, would probably convert binitronaphthaline into alizarine. Experience has confirmed this idea. By the following process, artificial alizarine may be prepared:—

Introduce a mixture of binitronaphthaline and concentrated sulphuric acid into a large porcelain capsule, heated in a sand bath. When the temperature is raised, binitronaphthaline dissolves completely in sulphuric acid. When the mixture reaches 200°C., throw in minute grains of zinc, and in a few instants sulphurous acid is disengaged. The operation takes about half an hour. Then, if a drop of the acid mixture is made to fall into cold water, it develops a beautiful red-violet color, owing to the formation of alizarine. Sometimes the reaction becomes energetic, if a large mass is operated upon, if there is too much zinc, and if the temperature is not carefully attended to. In such a case the sulphuric acid boils r pidly; abundant white vapors are disengaged with extraordinary noise and violence. It must be added that the latter inconvenience is easily avoided by adding only small quantities of granulated zinc, and by watching the temperature. When this accident does happen, the proportion of alizarine is greatly diminished, but still a considerable quantity remains in the residue.

The reaction over, dilute the liquid with eight or ten times its volume of water, and then boil it. In a few minutes, throw the liquid on a filter. Cooling causes it to deposit alizarine, in the form of a red jelly, sometimes adhering to the vessels, sometimes suspended in the liquid. In either case, this jelly appears, under the microscope, to be composed of a mass of very distinct, pointed crystals. The mother waters are colored dark red, and hold in solution large quantities of alizarine. They can be immediately used for dyeing after dilution with water and proper saturation. They contain large quantities of sulphate of ammonia. Some undissolved alizarine remains on the filter, which is easily carried off by caustic alkalies or carbonates, and precipitated anew by acids.

In the preceding reaction, zinc can be replaced by various substances; for example, tin, iron, mercury, sulphur, charcoal, &c.—in a word, by all bodies simple or compound, organic or inorganic, which react upon and reduce sulphuric acid at a high temperature.

Rival to Gutta Percha.

At a late meeting of the French Academy of Sciences M. Serres gave an account of the *balata*, a shrub which abounds in Guiana, and affords a juice which, he asserted was superior, for many purposes, to gutta percha, but especially as an insulating material for enveloping telegraphic wires. The milk or juice is drinkable, and used by the natives with coffee; it coagulates quickly when exposed to the air, and almost instantaneously when precipitated by alcohol, which also dissolves the resin of the *balata* juice. All the articles made with gutta percha can be made with the sap of the *balata*, and it has no disagreeable smell. When worked up it becomes as supple as cloth, and more flexible than gutta percha. M. Serres exhibited a number of articles manufactured of *balata* milk. Up to the present time it seems, from M. Serres's account, not to have become an article of commercial export.

Science versus Romance.

We are indebted to the editor of the *Visitor*, published at Marengo, Iowa, for the following complimentary remarks:—

Romance is fascinating, but science is ennobling Therefore, seeing that we are commanded in Holy Writ to "do good and to communicate," and furthermore we are cautioned to keep it in remembrance to "forget not," it is for the good of mankind in general that we inform our readers that the SCIENTIFIC AMERICAN is a medium through which they may obtain more really useful information than they could by imbibing all the sensation story papers ever written.

The editor of the *Daily Times*, Brooklyn, N. Y., said to his readers not long ago:—

We were conversing with a tradesman the other day, who assured us that he would not miss taking the SCIENTIFIC AMERICAN on any account, and referred particularly to one improvement which he had been able to make in his business from a hint given in its columns, which added largely to his profits.

The same sentiments as the above we have heard expressed a great many times by careful readers of the SCIENTIFIC AMERICAN.

Important to American Grain Shippers.

The following decree in reference to the importation of grain has just been published in the Paris *Moniteur*:—

From the 15th of the present month till the 30th Sept., 1862, the cargoes of grain and flour, rice, potatoes, or dry vegetables, carried on rivers and canals not conceded to public companies, will be exempted from all internal Navigation Dues levied by the State. The same exemtion will be extended to the dues levied on canals that have been so conceded, and which may be repurchased under the authority of the laws of the 28th July and 1st Aug., 1860.

Foreign vessels may, till the same date, and under the same conditions as French vessels, navigate all the rivers and canals of France exempt from these dues, wherever their cargoes may have grown, provided they consist of grain and cereals, as specified in the former article.

Whatever may be the date of the arrival of such vessels they will be exempted from dues, provded they left their place of shipment before the 30th of Sept., 1862.

THE SHORTEST PASSAGE YET.—The Prince Napoleon left Boston in his steam yacht, the *Jerome Napoleon*, Sept. 30th and arrived at Brest Oct. 7th; making the passage in 6½ days. The vessel is a screw propeller, and is one of the sharpest and handsomest craft that we have ever seen.

A SECOND crop of tobacco is growing at Enfield, Conn., a crop that has shot up from the old stalk cut more than a month ago. It is fully a foot and a half high, and will soon be cut and sent to market

STEAMBOATS have been running on the Delaware and Raritan canal, N. J., for the past seventeen years. It is no uncommon thing to see six screw propellers of large size within sight of one another on this canal.

THE Directors of the *Great Eastern* have voted $40,000 for repairs, and $115,000 as a working capital for the outfit of another voyage. These sums are to be borrowed upon a second mortgage on the vessel.

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THE PATENT LAW IN THE HANDS OF A CAMBRIDGE PROFESSOR.

Appleton's New Encyclopedia, Vol. 13, contains an article on Patents from the pen of Theophilus Parsons, Professor in the Cambridge Law School. We would gladly reprint the entire article but for its great length. As it is, we will content ourselves with offering a few remarks upon it. In this article, the learned Professor has shown two things clearly, however he may err in others. He quotes his predecessor in the chair of the Cambridge Law School, to prove that the "law of Patents is the metaphysics of the science," and also that he does not very thoroughly understand the science himself. Story, great and eminent in all branches of jurisprudence, by his numerous adjudications under the Patent Acts of 1793 and 1836, laid the foundation of the system of Patent Law in this country. He was the first American Patent lawyer, and tried, as judge, many Patent causes, and made the subject an especial study. This every lawyer must do who expects to practice successfully in these causes; and he must not only be possessed of legal acumen, but also of mechanical aptitude. Patent Law is as much a specialty in the legal profession as the practice of Law itself is a specialty in the community. This is well understood in the profession, and it is seldom that a member of it will venture to manage a Patent cause, who is not well versed in the *theory* and *practice* of this particular branch. In the exceptional cases, the last analysis, the client's protest, generally shows the truth of our remark.

No wonder then that Professor Parsons, who probably had never practiced in Patent cases, and never made this branch of the law his special study, should commit some errors in the summary he has presented of "the Law of Patents." It is but a concise summary which he professes to give, and we take pleasure in saying that this appears to us, in many parts of it to be substantially correct, but some important errors occur, which, appearing as they do, in a popular work so generally resorted to and relied on for correct information, ought to be corrected. We have already, in our publication of the 19th October, pointed out one grave mistake which the learned Professor made, in consequence, no doubt, of a *hasty* reading of the report of the case he referred to. We shall now proceed to mention a few others.

We find the first of these at the very threshold of his essay. The writer, under the head of "Who may have letters patent," remarks that the Statute says "Any citizen or citizens, alien or aliens, having resided one year in the United States, and taken the oath of his or their intention to become a citizen or citizens, *may have Letters Patent.*" Whereas the Statute of 1836, which is the principal Patent Act, Sec. 6, provides that "any person or persons" may have a patent and only requires the applicant to make oath of what country he is a citizen, and requires foreigners to pay more fees to the Patent Office; but this distinction is abolished by the 10th Section of the Act of 1861. The restriction quoted by the Professor is from the 12th Section of the Act of 1836, where it is applied to *caveators* only, and this is still the law, and the same restriction is applied under the 11th Section of the Act of 1861 to applicants for patents for designs, &c. The Patent Act of 1793 also limited the right to take out Letters Patent to citizens of the United States. But under the present Patent Acts, "any person or persons" of whatever nation, not discriminating against our citizens, may obtain Letters Patent, all on the same terms; except that in case of Designs, the applicants for patents and caveators, in all cases, are subject to the restriction quoted by the learned Professor, who has here given us another instance of careless reading.

The next error we shall notice in the article in question, is in this annunciation—"If the inventor has assigned, the patent may issue to his assignees, but none are his assignees but they who receive the whole of his interest. If he reserves any part, it cannot be issued jointly to him and assignees; but if he has more than one assignee, it may issue to all the assignees jointly." It would be very absurd if such were the law. Why cannot there be an assignee of a part of the inventor's interest, and what is a joint assignee of such interest but an assignee of an undivided part of it? Why cannot the inventor reserve a part of the invention and take the patent to himself and his assignee? We answer that he can, and that it is the frequent practice of the Patent Office to issue Letters Patent in this way, and there is no such restriction in the law, as the writer in question supposes. Patents are issued to assignees under the 6th Section of the Act of 1837, which provides that "any patents hereafter to be issued, may be made and issued to the assignee or assignees of the inventor or discoverer, &c.;" and does not provide that they may issue jointly to the inventor and assignee, but the law already provided for issuing Letters Patent to the inventor, &c., and no further provision was necessary. But it was, doubtless, in consequence of the omission of this provision that the Patent Office adopted the barbarous practice and form (legally speaking) of an assignment by the inventor in these cases, to himself and the assignee or assignees, in order to answer the letter of the Statute, the spirit of which was ignored. But Professor Parsons should have recollected that a man's conveyance to himself is a nullity, and his conveyance to himself and another of the whole of a thing is in law a conveyance to the other of one-half of it, and the other half is reserved to himself. In such a case, if the thing assigned is an invention, the patent issues to the inventor and assignee jointly. Accordingly, it is the more recent and common, and much the most proper mode in such cases, for the inventor to assign the portion he intends to, and request the patent to be issued to himself and the assignee or assignees jointly. We have several copies of such instruments before us duly certified from the Patent Office.

The language used by the Professor to express the well-settled principle that turning an existing invention to a new use, is not patentable, but a patent can be obtained only for some *new machine, method, process*, &c., to produce a given effect, is somewhat singular. He says "a man may observe that a certain mill grinds corn and beans very well, and then take out a patent for it as a coffee mill because he was the first that ever thought to put that mill to that use. But he may have a patent for his coffee mill, although every thing in it had been used before, and although something like it has been used for some grinding, if the same thing has not been applied to do work of the same nature." It is extremely difficult to make any thing of such loose language as the last sentence but a contradiction of the first sentence, which first is very correct.

The next criticism we have to make upon this article relates to the remarks upon the 11th section of the Act of 1861, relating to patents for designs, &c., and the fees to be paid to the Patent Office in such cases. It states that "to all foreigners the fee is $300." Whereas, by the terms of this Section, as we have seen, only "any citizen or citizens, alien or aliens, having resided one year in the United States, and taking an oath of his or their intention to become a citizen or citizens," can apply for a patent for a design, &c., at all—and, of course, no fee is prescribed for foreigners to pay, but the 10th Section of the same Act, as we have also seen, abolishes the discrimination contained in the Act of 1836, whereby all foreigners except citizens of Great Britain, &c., (who were to pay $500,) were to pay $300 on applying for a patent. The Professor also states that the fee for a caveat is $20, but by the Act of 1861 it is reduced to $10, which he does not state.

The next statement of the learned Professor, which we shall notice is, that "any person who shall, in any way whatever, put any word or mark upon a thing not patented, which shall indicate that it is the subject of a patent, or put upon it the name of any patentee without his consent, or, if it be patented, fail to stamp or engrave on the article the fact and date of the patent, is liable to a heavy penalty." This is a very imperfect statement of the provisions of the 5th and 6th Sections of the Act of 1842. The last clause is the provision of the 6th Section of this Act, which is entirely repealed by the Act of 1861; the pecuniary penalty is abolished, and a different and milder penalty is provided, viz., that the patentee who neglects to mark his articles with the date of his patent, &c., shall not recover for infringements, unless he proves that the defendant infringed after he had notice of the patent, all which is ignored by the learned Professor.

The last statement of the writer in question which our limits will allow us to note is as follows:—"Generally an injunction will not be granted until the plaintiff's rights, and the defendant's wrong, have been established in an action at law. But when the infringement is certain, a court of equity will proceed at once." A most incorrect statement of the rule that before a court of equity will grant an injunction against the infringement of a patent, it requires either that the validity of the patent should have been settled by the verdict of a jury, or have been for some considerable time acquiesced in by the public, and the patentee have been in possession and enjoyment of the right for the same time. The question whether a court of equity will entertain the case has nothing to do with "the defendant's wrong" or "the certainty of the infringement." That must appear by satisfactory process in the case itself, as well as in all other cases.

But we are weary of exposing the errors of this very crude article. We are surprised that so learned a jurist as Professor Parsons should suffer such a production to go forth to the world as his own, and we are almost inclined to surmise that it was prepared, as parts of law books are said to be sometimes compiled by Cambridge law students. And we are still more surprised that publishers of a work which aspires to give correct and useful knowledge upon the various subjects of which it treats, should not have secured the services of the learned and able author of the standard work on American patents, or of some other of the several skillful patent lawyers in the country, for the preparation of a summary upon a subject of such great and widespread interest to the public, since so many parties interested will naturally look to such a work for information. Instead of proving such a guide as they require, the summary in question, though, as we have already said, in some parts well enough, yet, on account of its glaring defects, some of which we have undertaken to point out, will turn out but an *ignis fatuus*.

Brisk Times in Newark.

Manufacturing in Newark, N. J., is represented as being very brisk. Many of the larger establishments are running night and day, while all are pushed to their utmost capacity. Sales among dealers in leather reach monthly an unprecedented figure, and manufacturers of cavalry equipments, of swords, harnesses, shoes, clothing, knapsacks and the like, are unable to fill, with anything like the desired rapidity, the orders which rush in upon them. Of course this condition of affairs is most favorable to the general good, affording as it does constant employment to thousands who, three months ago, looked with dismay upon the winter's prospect. With proper economy there will be this year less of real suffering among the workmen than for many winters past. Even should the demand for government work be diminished, or entirely cease, that now on hand will give employment for months to come, carrying the artisans and mechanics beyond the extremest rigors of the coming inclement season. This is certainly very gratifying information.

PROSPERITY OF CALIFORNIA.—No State is now more prosperous than California. The war which is so destructive to industrial pursuits in other States, has no injurious effect there. Citizens here represent that the idea which once prevailed of a political separation of the State from the Federal government is obsolete. The failure of the three road bill is not regretted. One route, and that a practicable one, will no doubt be designated and the work commenced under the auspices of the Federal government, before the end of another year. Any alarm of war with foreign naval powers that may occur during the next session of Congress will cause the immediate enactment of a Pacific railroad bill. It is even believed that President Lincoln and Secretary Cameron will recommend it to Congress as a military necessity. There are many noble mechanics and manufacturers in the young State of California in whose prosperity we cannot but feel a deep interest.

THOSE of our readers who may desire to obtain a general idea of the geological history of the earth, will be able to do it in a very easy and pleasant manner by reading the reports of Dr. Stevens's lectures, the first of which we publish on another page. Dr. Stevens has devoted a great deal of time to the examination of rocks and the study of all the literature on the subject. He is not only a thorough geologist, but he is also a pious and orthodox Christian.

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RECENT AMERICAN INVENTIONS.

Cider and Wine Mill.—The object of this invention is to attain a mill for grinding or crushing apples and other fruit, for the manufacture of cider, wine, &c., in a more efficient manner than hitherto, and to this end the inventor uses, in connection with a rotating toothed cylinder, one or more vibrating or swinging crushers. The invention also has for its object the combining of a screw press with the crushing device in such a way as to greatly facilitate the pressing of the juice from the pomace. This mill is the invention of J. R. Gates, of Louisville, Ky.

Improved Braiding Machine.—The manufacture of wide braid by the braiding machines in common use in this country, has been so difficult and imperfect, that nearly all the braid of above one quarter of an inch wide, which has been used, has been imported. The difficulty has resulted from the great friction produced between the necessarily large number of threads crossing each other, such friction preventing the threads from being drawn up close together in the braid, more especially at the edges thereof, by the mere tension of the threads themselves. The object of this invention is to overcome this difficulty above mentioned, and to this end it consists in the application to braiding machines of what may be termed beaters, operating between the crossing threads to beat or press them up into the braid. This machine was patented by Henry W. Cady and James M. Carpenter, of Pawtucket, R. I., and Gilman K. Winchester, of Providence, R. I.

Improved Street-Sweeping Machine.—This invention relates to certain improvements in a street-sweeping machine for which Letters Patent were formerly granted to the inventor, Laughlin Conroy, of New York City. The object of the present invention is to render the endless sweeping apron much more flexible than heretofore, so that it may conform perfectly to the irregularities of the surface of the ground or street, and be kept in a proper taut state at all times, and also be capable of being raised and lowered automatically, with the opening and closing of the bottom of the dirt-box, so that the apron and its concomitant parts may easily pass over the discharged dirt. The invention has further for its object a flexible comb or plane, of more perfect construction than the one hitherto used, and which will adapt itself readily to the inequalities of the surface of the ground or street, and be capable of being elevated with facility when necessary, as in the case of "backing," or when the machine is not at work, and is being drawn from place to place.

Device for Lowering Piers into the Water.—In building piers of masonry for bridges and other structures over water, the piers are in many cases built on platforms, which are lowered into the water from time to time, as the work progresses, until the platform rests on the bottom. The platforms now used for such purpose are supported by screw rods from a suitable framing, and the nuts of the rods turned independently and separately by operators where the platforms are to be lowered. The difficulty attending this arrangement is the exponse and tediousness of the operation of lowering, and also the care required in keeping the platforms level or horizontal as the rods require to be lowered precisely alike. The object of this invention is to overcome these difficulties, and to this end the inventor, Chester Van Horn, of Springfield, Mass., connects the nuts of the several screw rods by mechanism so arranged that all the nuts will be operated simultaneously from one and the same driving shaft, and consequently not only much labor saved in lowering the platforms, but the horizontality of the same always preserved.

Portable Gymnasium.—The principal object of this invention is to combine, within a small space, the fixed apparatus commonly employed in gymnastic exercises, and make such parts thereof as may be desirable, conveniently adjustable or variable for persons of different size and strength, and to make the whole portable. To this end the invention consists of certain novel constructions and arrangements of certain parts of the apparatus, and in a certain novel arrangement of the several parts in combination with each other, whereby the desired results are obtained. This apparatus, which is very ingenious and convenient, is the invention of George and William Hanlon, two of the Hanlon Brothers of New York City, the celebrated gymnasts.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING OCTOBER 29, 1861.

Reported Officially for the Scientific American.

PATENTEES, READ THIS.

The new Patent Laws which went into force on the 2d of March last, authorized the Commissioner of Patents to have all the specifications which form part of the Letters Patent printed.

This is a wise provision, and it renders the documents much handsomer than the old system of engrossing them on parchment; besides, in passing before the printer and proof reader, the clerical errors, which were often made by the copyist, are mostly obviated, thus rendering the patent more likely to be correct.

But to afford the printer and proof reader an opportunity to do their work properly, the Patent Office is obliged to withhold the Letters Patent after granting them, from *four to six weeks* after the claims are published in the SCIENTIFIC AMERICAN.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 2, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

2,559.—Wyallys Avery, of Salisbury, N. Y., for an Improvement in Window Blind Fasteners:

I claim the combination of the catch upon the shutter with that upon the sash, so arranged that when the sash is lowered the blind will be secured and the converse, substantially as specified.

2,560.—William Beach, of Hamden, Conn., for an Improved Tanning Composition:

I claim, first, The use of rye bran in tanning compounds for the purpose set forth.

Second, The within described tanning compound, composed of the several ingredients named, in substantially the proportions described.

2,561.—Lester C. Beardsley, of Cleveland, Ohio, for an Improvement in Ventilators for Railroad Cars:

I claim the reservoir, I, perforated plate, J, tubes, L and H, and reversible funnel, K, when combined, constructed and operated as described.

2,562.—D. C. Brown, of New York City, for an Improvement in Running Gear for Four-Wheeled Vehicles:

First, I claim the toothed movable segmeent, D, and segment, E, in combination with the sliding spring button, or detent, H, when constructed and operating, substantially as and for the purpose above set forth.

Second, The movable segment, D, when constructed and operating as described to yield to the forward axle and wheels a limited motion independently of that imparted to the hind axle and wheels.

Third, The tracks, b b, and ways, c c, in combination with the frames or supplemental reaches, C C, as and for the purpose described.

2,563.—S. Burr, of Cedar Grove, Wis., for an Improvement in Washing Machines:

I claim the washing machine constructed and arranged substantially as described, with a cranked shaft working the dashers of a tub, and a press with an elastic bearing delivering the drainage to the tub, combined in the manner specified.

2,564.—N. F. Burton, of Plymouth, Ill., for an Improvement in Plows:

I claim the combination of the subsoil plow, I, with the surface plow, M, when said plows are attached to adjustable beams, A A, arranged substantially as and for the purpose set forth.

I also claim, in combination with the subsoil and furrow plows, I M, the roller, K, attached to the frame, J, and arranged to operate conjointly with the plows, as set forth.

I further claim the attaching of the axle, D, to the beams, A A', through the medium of the ball-shaped rod, L, in combination with the arm, H, attached to the axle, D, and having its bearing or fulcrum on the rod, L, as described, whereby the depth of the penetration of both shares may be regulated as desired.

[This invention relates to a gang plow designed for surface and subsoil plowing and consists in a novel and improved arrangement of parts whereby the depth of the furrows may be regulated as desired, and the soil thoroughly plowed or broken up and left in a favorable state for the cultivation of crops.]

2,565.—Henry W. Cady and James M. Carpenter, of Pawtucket, R. I., and Gilman K. Winchester, of Providence, R. I., for an Improvement in Braiding Machines:

We claim the employment in braiding machines of devices such as we have termed "beaters" applied to operate between the threads, substantially as and for the purpose described.

And we also claim giving the said beaters a distinct and separate rising and falling movement as well as a movement toward and from the center of the machine or point where the braid is produced, substantially as and for the purpose set forth.

2,566.—Westley Chase, of Buffalo, N. Y., for an Improved Camp Chest and Table Combined:

I claim, first, The combination of extension leaves, A B, (one or both) and hinged legs, C, for supporting the leaves when extended, with a camp chest, in the manner and for the purpose substantially as set forth.

Second, The combination of the corner pieces, J, with the removable legs and chest as a means of fastening the removable legs to the chest, for the purposes and substantially as described.

Third, Fastening the removable legs to the outside of the chest for transportation in the manner and for the purposes substantially as set forth.

2,567.—Stillman A. Clemens, of Rockford, Ill., for an Improvement in Machines for Sawing Fire Wood:

I claim operating one or more saws, c c, by the oscillating frame composed of the arms, f and h, the brace, j, and handle, i, in connection with the forked rest, b, and the device for guiding, feeding and suspending the saws, by the rollers, l and p, arranged to run upon the back and toothed edges of the saws, substantially as described and for the purposes set forth.

2,568.—L. Conroy, of New York City, for an Improvement in Street-Sweeping Machine:

I claim, first, The arrangement of the rollers, Y o*, connected through the medium of the frames, X, levers, W, rods, k* and links, l*, the levers, W, being on the shaft, V, which has its ends fitted in slots, f*, in the sides of the box or framing, A, and is connected to the plates, P P, by bars, r*, substantially as and for the purpose set forth.

Second, The arrangement of the sliding and revolving cylinder, I, straps or belts, R R, levers, Q, and pulleys, S S, on shaft, T, substantially as shown for the purpose of readily raising the sweeping apron, M, when desired.

Third, Connecting the bottom, D, of the box, C, to the slides, H H, (of the cylinder, I,) by means of the cords, c c, when said cords, thus attached, are used in connection with the straps or belts, R R, levers, Q, connected with the plates, P, and all arranged as shown to admit of the automatic, simultaneous elevation of the sweeping apron, M, with the discharging of the contents of the box, C, as set forth.

Fourth, The plates, L, fitted on the axle, K, secured to the cloth or cadvas, f, and constructed and arranged substantially as described to form a flexible inclined plane or surface for the sweeping apron, M, to convey the dirt up to the box, C, as set forth.

Fifth, The bar or rod, M*, connected to levers, N N, which are secured to the bars, J J, and connected to the shaft, O, by cords, g g, substantially as shown to admit of the elevating of the plates, L, when desired.

2,569.—Richardson Coddington, of Leonidas, and Dougal McCall, of Kalamazoo, Mich., for an Improvement in Plows:

We claim the combination of the parts as follows: A, beam and handles, B, standard bolt, C C, cutters, D D, right and left mold boards, E E, reversible shares, F, fastener, G, frame work, and, H H, false land sides, when arranged and constructed substantially as and for the purpose described.

2,570.—George H. Cook, of New Brunswick, N. J., for an Improved Mode of Separating Compounds of Iron from the Water of Salt Wells and Springs:

I claim the use of black or peroxyd of manganese in hastening the separation or precipitation of oxyd or other compound of iron from the water of salt springs or wells.

2,571.—Robert R. Crosby and Josephus Harris, of Boston, Mass., for an Improved Clothes Wringer:

We claim the arrangement of the lever, C, and spring, D, combined and operating substantially as set forth.

2,572.—Henry Davies, of Portsmouth, Ohio, for an Improvement in Swings:

I claim the application of a foot board connected in such a manner to rods or cords, suspended either back or in front of the points, C, so as to enable a person to operate the swing while in it.

2,573.—C. H. Denison, of Brattleboro', Vt., for an Improvement in Mode Attaching Hubs to Axles:

I claim the rod, F, fitted in the arm, B, of the axle, C, and provided at one end with the eccentric or button, G, and at the opposite end with an arm or crank, b, as and for the purpose set forth.

[The object of this invention is to obtain a very simple, cheap and durable means for securing hubs on the axles of children's vehicles, and consists in having a rod fitted longitudinally in the end of the axle and provided at its outer end with button attached eccentrically to it the inner end of the rod being provided with an arm or crank for turning the rod, and thereby adjusting the eccentric which in a certain position retains the hub on the axle.]

2,574.—L. M. Doudna, of Amherst, N. H., for an Improvement in Hand-Mowing Machines:

I claim the combination of the stationary cutter plate, H, and vibrating cutter plate, J, operated through the medium of the bar, I, and serpentine ledge, F, which is attached to the drum, E, of the wheels, D D, all being arranged substantially as and for the purpose set forth.

2,575.—Noah Downing, of Brooklyn, N. Y., for improvement in Safety Belts:

I claim the combination of the metallic belt, A, with the box or pocket, B, the same being used and secured, substantially as and for the purpose specified.

2,576.—John Evans, of New Haven, Conn., for Improved Machine for Heading Carriage Spring Heads:

I claim, first, The combination of the adjustable gages, J J., with the counter die, H, and plate, I, when arranged and operating in the manner, and for the purposes described.

Second, I claim the right and left hand punch, M, in combination with the adjustable right and left hand dies, L L, and gage pin, n, when arranged and operating in the manner and for the purposes described,

[This invention relates to certain improvements in machines for making carriage spring heads, and consists, firstly, in an arrangement for gaging the heads so as to have them of a uniform size and shape; and secondly in an arrangement of adjustable right and left hand dies and punch for trimming the ears of the spring head separately from the inner side.]

2,577.—Joseph R. Gates, of Louisville, Ky., for Improvement in Cider and Wine Mills:

I claim, first, The employment or use of the vibrating, crushing and fruit-retaining bars, P P, one or more in connection with the cylinder, G, and concave, J, or their equivalents, all arranged to operate substantially as and for the purpose set forth.

Second, The arrangement of the crank shaft, N, connecting rods, O O, with the gearing, C D E M, and shafts, B F, substantially as shown for operating simultaneously, and from one and the same driving shaft, B, the rotating cylinder, G, and vibrating bars, P P.

Third, in combination with the vibrating, crushing, and fruit-retaining bars, P P, cylinder, G, and concave, J, the inclined guide board, Q, arranged in relation with the cylinder, bars, and concave, to direct or guide the fruit properly between the cylinder and concave, as set forth.

Fourth, The two fruit or pomace receptacles, S S, placed upon a platform, R, when said receptacles and platform are used in connection with a screw, T, and plunger, W, and also with a crushing device formed of the cylinder, G, concave, J, and vibrating bars, P P.

2,578.—Christopher Grimshaw, of Milwaukee, Wis., for Improvement in Breech-loading Ordnance:

I claim a breech loading cannon bored completely through from end to end, and provided with a circular tapering solid breech plug, ground to fit a corresponding aperture extending transversely through the bore, and of larger diameter than the latter, all as explained.

[This invention consists in the use of a solid conical plug of larger diameter than the bore, inserted transversely through the latter. The gun is bored completely through, and the cartridge inserted from the rear. The construction of the parts is such that the plug which closes the bore in the rear of the charge possesses great strength, and may be kept perfectly tight and effective under all changes of temperature and after long use.]

2,579.—William and George Hanlon, of New York City, for Portable Gymnasium:

We claim, first, The substitution for the inelastic cords and weights of the pulling apparatus, of a series of elastic cords so combined with the pulling handles that the several cords can be separately attached to, and detached from, the said handles at pleasure, substantially as and for the purpose specified.

Second, The horizontal handles, K K, constructed with hooks, e e, and fitted to a series of mortises, d d, in the post, B, or other equivalent upright support, which permit of their adjustment at different distances apart, substantially as and for the purpose set forth.

Third, Making one of the parallel bars adjustable nearer to or further from the other at pleasure, substantially as and for the purpose specified.

Fourth, Combining in one apparatus the inclined and horizontal ladder, the trapeze, the pulling apparatus, and the parallel bars by an arrangement of parts substantially as specified.

2,580.—P. M. Hannas, of Easton, Pa., for Improved Water Wheel:

I claim, first, The gate box made of the two pieces, F, and G, the former being detachable from the latter, and both being constructed and arranged as and for the purpose specified.

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Second, The rings, E, and E′, applied to the wheels as set forth in combination with the annular plate, h, and the devices described or their equivalents, whereby the said rings may be moved from and toward each other by the turning of the said plates as described for the purpose specified.

Third, I claim the rings, E and E′, and the annular plate, h, in combination with the gate, H, and the lever, K, or its equivalent, the whole being arranged and operating substantially as described, so that the movement of the rings may depend upon that of the gate.

Fourth, The wheel, composed of the buckets, M, with their inclined outer ends, and the re-acting bucket, N, between the inclined flanges, q and r, the whole being secured to the shaft, L, in combination with the stationary block, P, its concave sides and curved vanes, Q, the whole being arranged as and for the purpose described.

2,581.—Thomas Harbottle and M. F. Fowler, of New York City, for Improved Apparatus for Directing Water to, and Maintaining Continuous Pressure upon, Hydraulic Rams:

We claim interposing between the pump and each of the rams of the series, the described apparatus to effect the maintenance of the pressure upon either of the said rams, while the pump is acting upon others of the series of rams, in the manner and for the purposes set forth.

2,582.—Samuel Herbert, of New York City, for Improved Canteen:

I claim, first, The legs, J J, screw cap, D, and mouth tube, E, with a soldier's cooking canteen when combined, arranged and operating in the manner and for the purposes described.

Second, I claim attaching a drinking and cooking cup to the inside of a canteen substantially as described.

2,583.—George J. Huling and Albert T[illegible]n, of Providence, R. I., for Improved Stove-Cover Lifter and Poker:

We claim the invention of the combination of the two, as shown.

2,584.—John H. Irwin, of Beardstown, Ill., for Improvement in Lamps:

I claim forming a bearing, 4, for the rod, F, of the wick wheels, 6 6, by turning or bending the part, 3, of the wick tube between the slots, 2, as and for the purpose specified.

[The object of this invention is to supply the flame of the lamp with a requisite quantity of air that will cause perfect combustion with a comparatively small glass chimney. The invention is also designed to secure the wheels of the wick-elevating device to the wick tube, in such a manner as to insure the wheels being kept in proper position, and also prevent them being caught and entangled in the wick, as is frequently the case in lamps now generally used.]

2,585.—John Jennings, Jr., of Natick, Mass., for Improvement in Spoke Shaves:

I claim the improved stock as made, with kerfs, d d, arranged within it and with respect to its tang holes, c c, and to receive screws, substantially in manner and for the purpose specified.

2,586.—Isaiah Johnson, of Alliance, Ohio, for Improved Non-Swagging Gate Post:

I claim the arrangement of the cap, C, brace, g, post, B, and sill, A, forming a non-swagging gate post, constructed and operating as and for the purpose set forth.

2,587.—John E. Layton, of Pittsburgh, Pa., for Improved Back Plate and Chimney Throat for Fireplaces:

I claim the construction of a throat piece and back plate for open places, combined in one piece, as a new article of manufacture.

2,588.—George McIlwain, of Philadelphia, Pa., for Improvement in Cases for Water and Gas Cocks:

I claim, the cap, B, provided with the opening, e, and lid, C, as described, when the said cap is applied and adjusted over the upper end of the tube, A, so as to rest, independently of the said tube, directly upon the gravel or sand which may be used to support the latter and the usual pavement, in the manner described and set forth and for the purposes specified.

2,589.—A. H. Miller, of La Porte, Ind., for Improvement in Apparatus for Evaporating Sugar:

I claim an apparatus for evaporating saccharine liquids, so constructed that the fire grate or furnace is adjustable under the pan to be heated, as set forth.

2,590.—William Mills, of New Athens, Ohio, for Improvement in Apparatus for Cleansing Feathers:

I claim, first, The employment or use of an ellipsoidal feather receptacle, B, and steam chest, D, arranged as and for the purpose set forth.

Second, In combination with the ellipsoidal feather receptacle, B, and steam-chest, D, the perforated steam tubes; F E C, and blast fan, G, all arranged for joint operation substantially as and for the purpose set forth.

[The object of this invention is to obtain a feather renovator which will be extremely simple in construction, and very portable, so that it can readily pass through a door of ordinary dimensions, and still be capable of operating in a very efficient manner.]

2,591.—Robert Morrison, of Newcastle-on-Tyne, England, for Improvement in Steam Hammers:

I claim flattening off the hammer bar of such apparatus working through both ends of the cylinder, or any other section which will prevent the bar from turning upon its axis, substantially as described, whereby, in addition to its being longitudinally guided in the upper and lower stuffing-boxes, it is effectually prevented from turning on its axis.

2,592.—S. G. Morrison, of Williamsport, Pa., for an Improvement in Window-Sash Supporter:

I claim the application of a body of gum elastic, B, or any other elastic material, to the extreme point of the eccentric, or any other substantially the same, and which will produce the intended effect.

2,593.—Stephen Moulton, of Bradford, England, for Improvement in Manufacture of Springs from Rubber and Steel. Patented in England, Jan. 10, 1861.

I claim the manufacture of india-rubber springs, having steel or other metal surfaces embedded therein to form springs and valves of various kinds, as described.

[This invention consists in combining india rubber and steel in the manufacture of springs by the imbedding of steel springs of spiral or other form within a body of india rubber.]

2,594.—Peter Pardee, of Washington, D. C., for Improvement in Ship Building:

I claim the combination of the three triangular hulls, A, and the main deck, B, when constructed and arranged so that the spaces, b, shall exist between the hulls and deck, the whole operating as set forth, and for the purposes described.

2,595.—Edmund Parker, of Meriden, Conn., for Improvement in Coffee Mills:

I claim making the braces which support the spindle box in the form of wings or inclined plates to form guides, and to cover the coffee or other grains, and to assist in cracking the same before passing between two grinders, substantially as described.

2,596.—Jacob Pleiffer, of Niagara Falls, N. Y., for Improvement in Railroad Signal Lights:

I claim the described mode of attaching and working signal lights for railroad switches, by means of the combination of the two levers, h and r, upright staff or fork, s s, and frame for colored glass, l, working substantially as set forth, and for the purpose specified.

2,597.—Charles Powers and P. Lancaster, of Bronson, Mich., for Improvement in Binding Attachments to Harvesters:

We claim the rotating head, E, provided with the slotted plates, g, in connection with the swinging or adjustable arm, F, provided with the plates, l, and the sliding cutter, M, all being arranged and operated in connection with the spring, O, substantially as and for the purpose set forth.

We further claim, in connection with the head, E, and plates, l, of the arm, F, the guide or forked plate, H, and spring, I, as and for the purpose set forth.

The object of this invention is to obtain a simple and efficient mechanism for binding grain, the same being designed for an attachment to teamsters, and to admit, by an easy manipulation, of the grain being carted from the machine in a bound state—that is to say, bound properly into sheaves.]

2,598.—Henry W. Putnam, of Cleveland, Ohio, for Improved Apparatus for Filling Bottles:

I claim so combining a force pump, by which the sirup is injected into the bottle in a given quantity with a fountain of water charged with carbonic acid, under pressure, by which means the bottle is filled with due proportions of the two liquids, with one continuous operation, substantially as described.

2,599.—G. A. Reiniger, of Stuttgart, Kingdom of Wurtemburg, for Improvement in Machines for Making the Bodies of Cigars:

I claim, first, The combination of the taper trunk, I I′ c c, the two aprons, F H, the throat, J, the knife, K, and the revolving boxes, R R, the whole operating together, substantially as and for the purpose specified.

Second, The traveling racks, 12 12, and boxes, 15 15, applied and operating substantially as described, in combination with the revolving boxes, R, R, for the purpose set forth.

[This invention consists in a machine in which the leaf tobacco is conveyed continuously in a compact form to a knife, which cuts it into bunches of uniform size, and delivers the bunches in a compact form to suitable receptacles, from which they may be taken without waste of material to receive the wrappers.]

2,600.—G. A. Reiniger, of Stuttgart, Kingdom of Wurtemburg, for Improved Machine for Putting on the Wrappers of Cigars:

I claim the combination of the rollers, H I, the apron J, and the fixed table, D, the whole operating together substantially as and for the purpose specified.

[This invention consists in the combination of two rollers, a flexible apron, and a fixed tube, whereby the wrapper is rolled round the "bunch" of tobacco of which the body of the cigar is made.]

2,601.—William Robinson, of Rochester, N. Y., for Improvement in Mode of Watering Cattle on Railroad Cars:

I claim, first, The combination of the troughs, a a, with the cords, pulleys, o o o o, and windlass, W, or their equivalents, the whole operating in the manner and for the purpose substantially as described.

Second, I claim forming the troughs, a a, with a movable section in front of the doors, so as to allow the cattle to pass out and in, and yet preserve the continuity of the trough.

Third, I claim the perforated secondary roof, whereby the cattle and cars may be effectually showered with water, for the purpose set forth.

2,602.—John Selser, of Williamsport, Pa., for Improvement in Self-Opening Canal Bridges:

I claim, first, The employment of a lever or levers, at or near the surface of the water, and connected with the bridge by means of chains or their equivalents, whereby the bridge may be opened, or partially opened, by the action of the boat thereon, substantially as described, and the concussion due to the boat striking against the bridge avoided, as herein set forth.

Second, I also claim the arrangement of the double track, each composed of four inclines, as shown and described, for the purpose specified.

Third, I also claim causing the action of the boat to sink a buoyant mass, whereby the buoyancy of the said mass tends to close the bridge again after the passage of the boat, in either direction, substantially as described.

2,603.—Christian Sharps, of Philadelphia, Pa., for Improvement in Breech-Loading Firearm:

I claim, first, The vertical sliding breech, D, in combination with the rear of the barrel when the latter is recessed, for the reception of the head, x, of a metallic cartridge substantially as set forth.

Second, The block, F, arranged on the sliding breech, substantially as set forth, and forming a medium of communication between the hammer and the metallic cartridge, for the purpose of discharging the latter, as described.

Third, The inclined notch on the end of the projection, h, of the sliding bar, H, the said notch being so arranged in respect to the head, x, of the metallic cartridge that when the latter is discharged a portion of the head will penetrate the notch as set forth, for the purpose specified.

2,604.—Samuel Shoemaker, of Smithville, Ohio, for Improvement in Lifting Jacks:

I claim the curved rack bars, D E, the lever, F, and the standards, B C, when the same are arranged and constructed as and for the purpose specified.

2,605.—Dryden Smith, of Biddeford, Maine, for Improvement in Self-Adjusting Uterine Supporters:

I claim the adjustable bar, H, set screw, J, and abdominal brace, A A, in combination with tube, c, the whole arranged in the manner and for the purpose as specified.

2,606.—Lucius Stebbins, of New York City, for Improvement in Iron Pavements:

I claim, first, The employment of movable teeth or keys, b, projecting through slots or openings, d, in flat metal surfaces, A, which form the pavement, substantially in the manner and for the purpose shown and described.

Second, Making the keys movable by means of weights, springs, or by any other desirable means, substantially as and for the purpose set forth.

Third, Forming the pavement out of two plates, A and E, each being ribbed, substantially in the manner specified, so that channels are provided to carry off the water and the dirt; or out of one plate, provided with suitable ribs to form such channels, and so that steam, water or hot air can be introduced under the pavement whenever it is desired.

2,607.—William Mont Storm, of New York City, for Improvement in Skin Cartridges:

I claim the application of the spiral fillet of gut, adherent to it, in lieu of using thread, muslin, or other material of twisted fibers, dissimilar in nature from the skin body of the cartridge, as heretofore essayed, and possessing the objectionable features explained, all substantially in the manner and for the objects given.

2,608.—B. F. Sweet, of Fond du Lac, Wis., for Improvement in Car Couplings:

I claim constructing the drawheads of railroad cars, by having wrought-iron plates or bars, A A, fitted by means of dovetail connections in cast-iron bodies, B, and secured therein by shrunken wrought-iron bands, C, substantially as shown and described.

[This invention relates to an improvement in the construction of the ordinary car couplings, and has for its object economy in construction and durability—results which, it is believed, are obtained in a much greater degree than by the ordinary modes of construction.]

2,609.—Henry Thirion, of Mirecourt, France, for Improvement in Blowers:

I claim the employment of the cylinder and apparatus described, for blast purposes, in the manner and for the purposes set forth.

2,610.—John A. Thompson, of Cayuga, N. Y., for Improvement in Railroad Car Ventilators:

I claim the combination of the box, B, grooved as described, with the three-sided deflector, A, the same being applied and operated in the manner set forth.

2,611.—Chester Van Horn, of Springfield, Mass., for Improvement in Mode of Lowering Piers into the Water:

I claim the connecting of the several nuts, D, of the screw rods, B, to a common driving shaft, J, substantially as shown, or in an equivalent way, when said screw rods and nuts are employed to sustain a platform, C, for the purpose of lowering piers into the water during the course of construction.

2,612.—Moses N. Ward, of Old Town, Maine, for Improvement in Tobacco Pipes:

I claim the combination of the cylinder, A, chamber, B, and stem, D, the whole constructed as described, and operating as set forth.

2,613.—William Medd Watson, of Tonica, Ill., for Improvement in Grain Separators:

I claim a machine composed of a pressure carrier, a perforated surface and a feeding mechanism for dividing mixed grain, and depositing the several kinds in separate places, substantially as described.

2,614.—W. M. Watson, of Tonica, Ill., for Improvement in Screws of Winnowing Machines:

I claim the combination of thin metal bars with a frame to form sieves and screens, substantially as described.

I also claim the method described of cleansing grain, by passing it over a screen having deep grooves with wide tops and narrow slotted bottoms, substantially as described.

615.—William Weitling, of New York City, for Improvement in Sewing Machines:

I claim, first, The employment of a thread carrier, a, consisting of a ewing-machine needle having no point and operating through the opening of the button hole, substantially as and for the purpose set forth.

Second, The arrangement for laying the upper loops with the hook, v, by the revolution of the thread holder, d, substantially as and for the purpose described.

Third, The arrangement by which the opening, z, in the bed plate, provided for the passage of the thread carriers, is alternately opened and shut by the employment of a thread regulator, e and f, operating substantially as and for the purpose set forth.

Fourth, The arrangement of the take-up tension, consisting of a combination of hollow axles, h′ h′, with rollers, h2 h2, weights, k k cord, r2, and double leader, j, operating substantially in the manner and for the purpose specified.

Fifth, The arrangement of alternately checking and freeing the take-up tension by the employment of a tension regulator, l and m, substantially as and for the purpose set forth.

2,616.—Andrew Whytock, of London, England, for Improved Metallic Sheathing. Patented in England Oct. 11, 1859:

I claim the described new or improved article of manufacture, as made of two or more sheets of metal permanently united together and subsequently covered or coated with another metal, substantially in the manner set forth.

2,617.—Solomon Beard, of Indianapolis, Ind., assignor to Hussey, Wells, & Co. of Pittsburgh, Pa., for Improvement in Plows:

I claim making the shares, mold boards, points, and other metal parts of steel plows, of the exact required shape and thickness, and of any desired pattern, by casting them of molten steel into suitable metallic molds or matrices, substantially in the manner set forth.

2,618.—G. W. Griswold (assignor to A. C. Sisson), of Abington, Pa. for Improved Spring Bottom for Beds, Chairs, &c.:

I claim a spring bottom for chairs, carriage seats, sofas, lounges, beds, &c., made of a series of slat or strip springs, one end of which is fastened and the other ends loose, said loose ends being restricted from leaving their support, substantially as and for the purpose described.

2,619.—J. S. Heartt, and Samuel English, of Troy, N. Y., assignors to J. S. Heartt, James Ostrander, of Troy, N. Y., and Joseph Ridgeway, of South Amboy, N. J., for Improvement in Machines for Making Fire-clay Gas Retorts:

We claim, first, The removable plate, e, when secured to and released from the end of the hollow core, B, having a communication with a supply of atmospheric air or other fluid, as and for the purpose set forth.

Second, The sliding core shell, k, when applied so that the core can be thereby made to terminate either within or beyond the end of the outside die, A, as described.

Third, The combination of the condensing air pump, P, or any equivalent therefor, with the outer die, A, mold, M, and support, F, core, B, extended opposite to the recess, n, in the mold, and a device for forcing the plastic material between the said core and die into the mold, substantially as and for the purpose set forth.

2,620.—Charles Mahan, Sen. (assignor to himself and Alfred Johnson), of Jamestown, Ohio, for Improved Clod Crusher:

I claim the arrangement of drag, A, harrow, B C D E, lever, G g, apertures, F, and catches, g′ and H, or equivalent devices, for simultaneous division and pulverization of the clods, or for momentary suspension of the harrow action, substantially as set forth.

2,621.—G. F. Schaffer (assignor to himself, August Schmidt and J. S. Steer), of New York City, for Improvement in Machinery for Dressing Hemp or Flax:

I claim the cylinder, c, provided with the rollers, d, in combination with the rollers, h, on the belts, g, as and for the purposes specified.

I also claim the hatchels, e, on the cylinder, c, in combination with the rollers, h, on the belts, g, or with the hatchels, i, on the said belt, g, or both, as and for the purposes set forth.

And I claim the feed rollers, k and l, one of which is grooved and the other rendered elastic by a covering of rubber or similar material, in combination with the said cylinder, c, and belt, g, provided with the rollers and hatchels, as set forth.

2,622.—E. D. Seely, of Brookline, Mass., assignor to himself, G. A. Phillips, of Dorchester, and T. F. Wells, of Roxbury, Mass., for Improvement in Gun Capping Implement:

I claim, first, Constructing a gun capper substantially in the form described, whereby it is made more convenient in use and more universally applicable than the disk shape used heretofore.

Second, Constructing the cap receiver separate and removable from the outer casing and with its projecting end formed into spring nippers, substantially as and for the purpose specified.

Third, The arrangement of the spring, n, operating substantially as shown and described, when combined with the follower and cap receiver, so as to be removable with them from the case.

Fourth, The guide to the delivery end of the instrument.

2,623.—Ancil Stickney, of Concord, N. H., assignor to himself and W. H. Hovey, of Springfield, Mass., for Improvement in Corn Shellers:

I claim, first, The combination of the box, or trough, C, and pressure plate, F, with the shell, A, and rotary toothed disk, D, when the several parts are constructed and arranged as and for the purposes specified.

Second, The arrangement of the ridges, m m m, on the interior surface of the pressure plate, F, whereby they operate as a right and left screw, substantially as and for the purposes specified.

RE-ISSUES.

127.—D. G. Littlefield, of Albany, N. Y., for Improvement in Stoves. Patented January 24, 1854:

I claim, in a stove which discharges the products of combustion into a flue or a space external to the room in which the stove is situate, an organization which temporarily confines the gases in a coal supply chamber or pot, then ignites them above the base of the grate, and passes them through an uninterrupted opening or openings, extending up from the grate to the closed sides or portion of the coal supply chamber, and burns them in a space or chamber laterally to the coal supply chamber or pot, then circulates the spent gases or a portion of them over the top of the coal supply chamber or pot, and then discharges them into and through a smoke flue passage, substantially as described.

128.—D. G. Littlefield, of Albany, N. Y., for Improvement in Stoves. Patented Jan. 24, 1854:

I claim, first, The vertical wedge shape passages, between the grate bars of the fire pot, substantially as described.

Second, The employment of a grated fire pot forming a downward continuation of a coal-supply pot, in combination with a gas consuming chamber or flue between the outer case and the connected fire and coal-supply pot, and an externally discharging spent gas pipe, substantially as and for the purpose set forth.

Third, I claim an illuminated exterior wall, M, in combination with an open-sided fire pot and an intermediate gas-consuming chamber substantially as described.

129.—W. T. Huntington and Hervey Platts (assignees of E. M. and J. E. Mix), of Ithaca, N. Y., for Improvement in Calender Clocks. Patented Jan. 31, 1860:

I claim, first, The employment in a calendar clock of a year wheel, K, and a detached leap-year wheel, L, applied to rotate about separate fixed axes, and combined and operating together, substantially as specified.

Second, The combination of the year wheel, K, detached leap-year wheel, L, detent, J, and a day-of-the-month wheel, F, of the construction described, the whole operating together substantially as set forth.

[This invention consists in certain novel means of governing the

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movements of the "day-of the-month" index at the end of the month of February, which are more simple and less liable to get out of order than the mechanism heretofore used for the purpose, and hence more reliable and certain in their operation.]

DESIGNS.

119.—H. K. Hotchkiss, of Bristol, Conn., for Design for Clock Case.

120.—C. W. Palmer, of Troy, N. Y., for Design for a Cook Stove.

121.—J. J. Morrisett, of New York City, assignor to J. L. Dodge, for Design for Hats.

Notes & Queries

T. G., of C. W.—To make sulphite of lime, dissolve quick lime in water to form milk of lime, and then force into the liquid by means of an air pump the vapor of burning sulphur.

B. and H., of Pa.—You will find in the "Encyclopedia Britannica" a description of the process of etching and other modes of engraving. It is a delicate art, however, and you had better get some one to teach you. There are doubtless many in Philadelphia who have learned the trade.

L. B. T., of Mass.—It is very difficult to cover cast iron with any metal by the electro-plating process. An experienced electro plater tells us that to plate with copper, metallic copper should be dissolved by means of the battery in a solution of the cyanide of potassium. For silver plating, deposit a coating of copper first.

H. R., of N. Y.—The yellow lacquer employed for brass work is composed of lac varnish colored with turmeric and anotta. Various bronze compounds can be purchased in most of the stores which sell painters' materials.

W. B., of Vt.—The cups of Dr. Drake's gas engine were made of platinum and maintained at a red heat for igniting the charges in the cylinder of the engine.

B. & Co., of Baltimore.—We are not acquainted with a metal equal to sheet iron for radiating heat in a tobacco-drying apartment, but why not use lar e brick flues covered with tiles of fire-brick, and a large furnace placed at one end of the drying room in place of iron stoves and iron pipes, as the latter rust out so rapidly? We believe you will obtain sufficient heat by using such flues. They are in common use in calico-print works.

D. S., of Ohio.—We have been informed that coal tar applied hot to timber having the dry rot, will arrest the decay. The experiment is worth a trial with your wheel shaft. We wonder that any wheel should be built with a wooden shaft in this iron age.

L. E., of Wis.—Gas can be made from rosin in any family with a very simple and small apparatus. There is no other substance known to us which is so convenient for making gas upon a small scale.

L. B., of Wis.—Morfitt's "Applied Chemistry" on soaps and candles, published by Parry & McMillan, Philadelphia, contains the information you desire respecting the manufacture of soap.

D. K., of N. J.—On February 12, 1856, W. E. Everett and Nathan M. Thompson, engineers, of this city, obtained a patent for softening the incrustations in boilers with steam. Mr. Lindsay, of London, who, we understand, has lately obtained an English patent for the same invention, was not aware, we believe, of the American patent. He can consult Mr. Thompson, who is now in London superintending the construction of boats by American machinery.

B. B., of Mich.—Pyroligneous acid is employed in dyeing, calico printing and for other purposes. Write to Messrs. Morgan, of this city, in relation to price, demand, &c. If the fuel in the salt works is properly burned, you cannot save pyroligneous acid from it.

W. M. W., of Mass.—You have a theory that the sun and planets were placed stationary in space, and that all their motion were caused by their mutual attraction for each other. What prevented the planets from falling into the sun?

J. O. M., of Albany, N. Y.—You will find a description of the composition for friction matches on page 183, current volume of the Scientific American. We sent a copy of the paper containing the article on this subject to your address two weeks ago.

T. O. S., of Conn.—Dr. Denis Papin, a French *savant*, a man of great ingenuity, was the inventor of the safety steam valve, This was one of the most useful inventions connected with the improvements in the steam engine.

G. W. B., of Iowa.—We cannot undertake your case upon the terms you propose. Under no circumstances can we become pecuniarily interested in patented inventions, and especially so long as we act as attorneys for procuring them,

G. W. J., of Mass.—The apparatus that you will really need in your chemical studies is within the reach of every mechanic. The great discoveries in chemistry have been made by means of a few cups, bottles, &c. You will find in "Ure's Dictionary of Arts. Manufactures, and Science," full directions for making varnishes. We recommend to you "Wells's Chemistry."

W. S. A., of N. Y.—You can obtain drawings and a description of Dimpfel's blower by ordering a copy of this patent from the Patent Office.

T. S., of Pa.—We are always happy to receive communications from practical men for publication. Should you decide to furnish us some articles for this purpose they will be sure to find a place in our columns if we deem them of sufficient interest to our readers.

H. W. S., of Cin.—To give you all of the facts on which Dalton's atomic theory is based we should be obliged to write an elaborate treatise on chemistry. In strict philosophical language the truth of the theory is not absolutely demonstrated, but it is confirmed by so many facts that it is universally accepted. The atoms are too small to be visible under the most powerful microscope, but the relative sizes of a portion of them are inferred from the relative volumes of the vapors,

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, Nov. 6, 1861:—

G. A. H., of N. Y., $20; A. S., of N. Y., $20; W. M., of N. Y., $45; S. B., of Conn., $20; L. H. O., of N. Y. $45; H. J. P., of N. Y., $45; W. H. J., of N. Y., $65; T. L., of Cal., $25; S. and P., of Conn, $15; E. M. S., of N. Y., $50; A. B., of N. J., $15; J. W. C., of N. Y., $30; P. and C., of Conn., $15; C. H. B., of Pa., $15; E. D. G., of N. Y., $25; E. and P., of N. J., $25; C. T. V., of Pa., $10; D. H., of N. Y., $15; C. V. P., of Mass., $45; P. and S., of N. Y., $15; A. K., of Oregon, J. T., of N. Y., $25; O. W. M., of N. Y., $25; J. McE., of N. Y., $25; $55; C. K. McL., of N. J., $25; W. H. J., of N. Y., $50; E. W., of Conn. $20; S. S. H., of Mass., $45; M. La R. H., of Ill., $60; G. and H., of Iowa, $20; W. E. F., of Mass., $45; J. W. L., of N. J., $20; J. C. and C. N. M., of Ill., $45; H. D. D., of Conn., $25; J. B. S., of N. Y., $15 T. M. C., of Mass., $15; F. G. W., of Mass., $15; W. J. C., of Pa., $15; J. V. N., of N. J., $10; H. C. S., of Me., $15; L. and W., of N. Y., $15; H. W. B., of N. J., $15; J. B. R., of N. Y., $325; T. F. L., of N. Y., $15; W. G. A., of Mass., 60; J. J. M., of Conn., $15; I. S. [illegible], of Pa., $25; S. J. D., of Ky., $15; E. McA., of Ill., $15; G. I. W., of Mass., $28; J. S., of N. Y., $40; V. B., of N. Y., $20; W. H., of V. Y., $25; J. W. C., of N. Y., $30; C. W. L., of N. Y., $25; W. R. S., of N. Y., $15.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from Oct. 30, to Wednesday, Nov. 6, 1861:—

[T. S. W. of N. Y.; T. L., of Cal.; H. H. D., of Conn.; J. McC, of, Wis.; W. L. F., of N. J.; S. T., of N. Y.; I. S., of N. Y. (two cases); W. H., of N. Y.; J. McE., of N. Y.; F. W. W., of N. Y.; J. W. C., of N. Y.; S. W. of Mass.; C. K. McL. of N. J.; C. W. L. of N. Y.; W. H. J., of N. Y. (two cases); T. S. of N. Y. (two cases); G. I. W., of Mas.; W. H. of Wis.; J. S. K., of Pa.; W. H. H., of N. J.; A. N. L., of France; E. M. S, of N. Y.; W. B., of N. Y.; O. W. M., of N. Y,

New Books Received.

The Westminster Review. Republished by Leonard Scott & Co., 79 Nassau street, New York.

The review of cotemporary literature in the October number is well worth the cost of the magazine.

Blackwood's Magazine. Published by Leonard Scott & Co, New York City.

The number of this magazine for the present month contains a severe criticism on the English Social Science Congress. It also contains "Meditations on Dyspepsia," and offers as a cure for the disease good cooking, good food, and plenty of hunting and fishing in forest and river.

Lady Maud; The Wonder of Kingswood Chase.—By Pierce Egan. A novel of 365 pages. Published by T. B. Peterson & Bro., Philadelphia.

The "*London Spectator* says "It is an admirable story." We wil take it for granted that this is true, and let others prove it by reading the novel.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

Invariable Rule.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Patent Claims.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

New Pamphlets in German.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application at this office. Address MUNN & CO.,
No. 37 Park-row, New York

RATES OF ADVERTISING.

Thirty Cents per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published, we will explain that ten words average one line. Engravings will not be admitted into our advertising columns; and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their Inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no secondhand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars, address—

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New York City

CHANGE IN THE PATENT LAWS.

PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws enacted by Congress on the 4th of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from $30 down to $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time and on the most liberal terms.

Testimonials.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,
CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,
Your obedient servant, J. HOLT.

Messrs. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,
Your obedient servant, WM. D. BISHOP.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention. If susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fee by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & Co., No. 37 Park-row, New York.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

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Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of the case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents' or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors*," Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and ring fortunes to the households of many a poor Inventor or his family. We have had much experience in procu ng the extension of Patents; and, as an evidence of our success in this department, we would state hat, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the ghts of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid), should be addressed to MUNN & CO., No. 37 Park-row, New York.

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PARTIES HAVING ARTICLES TO DISPOSE OF which, if sold in the United States, are liable to a patentee's tariff, or subject to infringement of some patent, may learn of a foreign market by addressing Box 1,378 Post Office, Boston. 19 2

NEW SHINGLE MACHINE—THAT WILL RIVE AND Shave 24,000 Shingles in a day, for sale by S. C. HILLS, No. 12 Platt-street, New York. 1 tf

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WOODWORTH PLANERS—IRON FRAMES TO PLANE 18 to 24 inches wide, at $90 to $110. For sale by S. C. HILLS, No. 12 Platt-street, New York. 1 tf

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THE BEST PAPER FOR THE TIMES!

MOORE'S RURAL NEW-YORKER, widely known as the most valuable and popular journal in its sphere; as the best and cheapest combined Agricultural, Horticultural, Literary and Family Newspaper on the Continent, will enter upon its Thirteenth Year and Volume in January, 1862. It has long surpassed all rivals in variety and usefulness of contents, and of late is more than ever before

THE FAVORITE HOME WEEKLY!

This is proved by its immense and rapidly-increasing circulation throughout the free States, Canadas, &c., and among all intelligent classes in both town and country. In addition to a great amount of practical, instructive and entertaining reading upon agriculture, horticulture, domesticeconomy, science, art, education, &c., with a variety of engravings, music, tales, poetry, &c., it contains a complete and carefully-prepared

WEEKLY SUMMARY OF THE LATEST WAR NEWS,

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A series of articles on this subject by Mr. Kendal will appear in the *Working Farmer and U. S. Journal*, published monthly at 23 Courtland street. 20 3

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A MESSIEURS LES INVENTEURS—AVIS IMPORtant. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous addresser dans leur langue natale. Envoyez nous un dessen at une description concise pour notre examen. Toutes communications seront reçues en confidence. MUNN & CO.,

SCIENTIFIC AMERICAN Office, No. 37 Park-row, New York.

NEW YORK OBSERVER FOR 1862.—IN ASKING the aid of all who may desire to extend the circulation of the *New York Observer*, it is proper for us to state distinctly the position it occupies with reference to the present condition of public affairs in our beloved country.

Having always maintained the duty of good citizens in all parts of the land to stand by the Constitution, in its spirit and letter, when that Constitution was assailed and its overthrow attempted, we accordingly at once gave a cordial support to the Government in its patriotic endeavor to assert its lawful authority over the whole land. Believing secession to be rebellion, and when attempted, as in this case, without adequate reasons, to be the highest crime, we hold

1. That the war was forced upon us by the unjustifiable rebellion of the seceding States.

2. That the Government, as the ordinance of God, must put down rebellion and uphold the Constitution in its integrity.

3. That every citizen is bound to support the Government under which he lives, in the struggle to reëstablish its authority over the whole country.

4. That the Constitution of the United States is the supreme law of the Government as well as of the people; that the war should be prosecuted solely to uphold the Constitution and in strict subordination to its provisions: and the war should be arrested, and peace concluded, just so soon as the people now in revolt will lay down their arms and submit to the Constitution and laws of the land.

The distinctive features of the *Observer* are,

1. It is printed on a double sheet, so as to make two complete newspapers, one devoted to secular and the other religious matters; and these may be separated so as to make two complete journals, while the price for both is no greater than is charged for many papers smaller than either one of the two.

2. It gives every week a complete synopsis of the most interesting events in all the denominations, including those that are called Evangelical and those that are not; as every intelligent Christian wishes to be well informed respecting all of them.

3. It gives a well-digested epitome of the News of the Day, Foreign and Domestic, prepared with great labor and care, so that the reader is sure to be put in possession of every event of interest and importance to the public.

The foreign correspondence of the *Observer* is unrivaled, and has long commanded the admiration of intelligent men.

TERMS FOR NEW SUBSCRIBERS.

1. To each new subscriber paying in advance $2 50 for one year, we will send the paper and a copy of our Bible Atlas, with five beautiful colored maps.

2. To the person obtaining subscribers we will give $1 for each new subscriber paying $2 50 in advance.

3. To any person now a subscriber sending us one new subscriber and $4 we will send both papers for one year.

Specimen numbers of the *New York Observer* will be sent gratis to any address that may be forwarded to us for that purpose.

The state of the country renders it important for us and esirable for the churches, that a new and earnest effort e made to extend the principles of good government nd sound religious truth into all the families of the land. In every neighborhood there must be some who do not now take a religious newspaper, and who might with a little exertion be induced to subscribe.

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Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an

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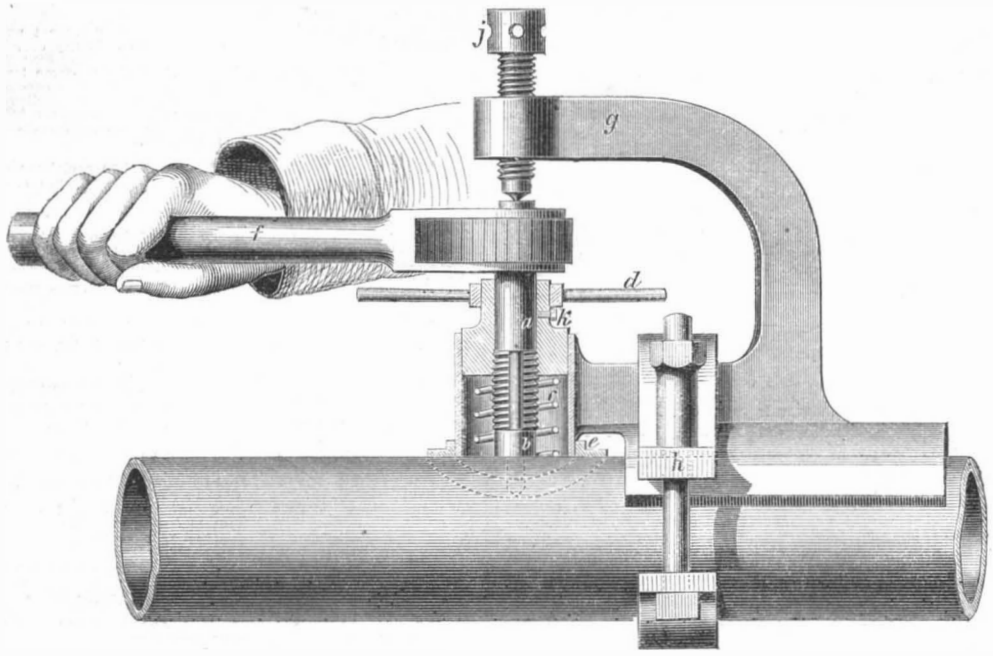
Apparatus for Tapping Gas Pipes.

'The *Mechanics' Magazine*, of London, speaks of this apparatus as follows :—

Among the numerous operations connected with the supply of gas, none are of more importance or of more frequent occurrence than drilling and tapping street mains for laying service pipes. The present method for effecting this, even allowing for recent improvements in the tools and tackle employed, is very defective ; it is hardly possible that the work can be properly performed, the tapped holes not being



UPWARD'S APPARATUS FOR TAPPING GAS PIPES.

perfectly formed and the joints subject to constant leakage.

Mr. Upward, who has had many years' experience as the superintendent of large gas works, having found that some apparatus was required to remedy the defects of the existing system of connecting service pipes, has invented a drilling and tapping apparatus. The objects to be obtained by it are :—First, to prevent accident from the escape of gas, whatever may be the size and situation of the main ; second, to enable any ordinarily skilled workman to make a well tapped circular hole for tubing of any size in the same time as with the usual kinds of tackle ; and, third, to prevent inconvenience and injury to the workmen employed in service laying and to persons in the immediate vicinity.

a is the tap, *b* a small drill fixed into the tap, *c* a spring to prevent the tap and drill from dropping when the hole is through, *d* handle and nut to press on the spring, *e* india rubber washer, which, from its form, sets down tight on the top of the pipe and prevents all escape of gas ; *f*, ordinary ratchet brace ; *g*, drill post and guide ; *k*, set screw to prevent nut, *d*, from turning on the tap.

The apparatus is used in the following manner :—The drill post is fixed to the pipe by clamps and bolts, *h*, and by tightening one or other of those bolts, the tap, with the nut and handle, *d*, should be made to turn round quite easily by hand ; the ratchet brace is then put on and the drilling operation commenced, taking care to feed down very lightly at first, or the point of the drill is liable to be broken, as there is no center punch used. When the tap and drill fall through the metal of the pipe, it will be necessary to ease back the handle, *d*, about a quarter of a turn, so as to allow the spring to keep up the tap and drill while the burr which is left on each side of the hole in the pipe is being cut out. When this drilling operation is complete, the set screw, *k*, is slacked, the tap is allowed to fall into the hole by unscrewing the nut with the handle, *d*, until it is quite out of the thread, the tap is then pressed by feeding down the screw, *j*, and turned at the same time by the brace until it is just entered, when the drill post can be removed, and the pipe tapped in the usual manner.

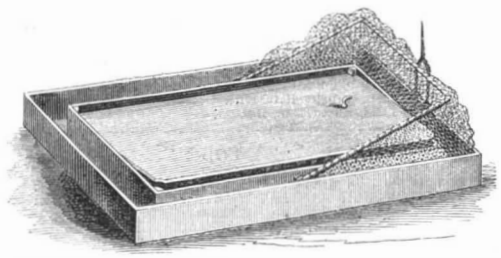
To prevent as much as possible all escape of gas, the patentee takes a small piece of pipe or connector, with the end which is to be screwed into the main stopped by a wafer of beeswax and tallow, so that when the tap is taken out, the pipe can instantly be put into its place ; the connections can then be made, and when all is complete, a slight amount of heat applied to the pipe will melt the wafer, and thus open the communication between the gas main and the house or premises.

Had such an apparatus as this been used by the workmen of the Great Central Gas Company when laying on their gas at the warehouse of Messrs. Morley, 121 Wood street, the whole of the premises might have been saved from destruction, and the shareholders' pockets from being mulcted of the sum of £25,000, the amount of damages awarded by the judges at the Court of Queen's Bench, July 4, 1861.

Is not this apparatus well worthy the attention of our plumbers and gas companies ?

CULLINGFORD'S BIRD TRAP.

The engraving illustrates a trap for the purpose of capturing birds invented by Mr. Cullingford, of England. It consists of a central platform which sways freely from side to side, being supported on a pivot at each end. On this platform is placed the bait, consisting of grain or whatever material may be attractive to the bird which it is desired to capture. Around this platform is a deep groove to contain the net, which is securely fastened down around one half of the trap, the remainder being attached to a wire forming three-fourths of a square ; this wire is turned into a spiral spring where it is connected with



the trap. The consequence of this arrangement is, that when the net is pulled back into the position shown in the cut, and then liberated, it is by the action of the spiral spring quickly thrown over the entire platform, securing any animal that may be upon it. When set for use the wire covering the net is forced back into the groove to the right hand, and secured by bringing over it the pointed wire which is shown in the erect position in the cut ; the point of this wire is held down by the small catch shown on the platform.

It is obvious that the movements of any bird or other animal on the platform must of necessity cause it to sway to one side or the other ; and the result is, that the pointed wire being liberated from the catch permits the spring and wire to pull the net over the platform and secure the bird.

A TUN of cannel coal yields about 10,260 cubic feet of gas, the illuminating quality of which is nearly double that of gas obtained from the common bituminous coal.

LONDON papers contain accounts of a late trial in the British metropolis with a new steam fire engine. The fire was lighted under a perfectly cold boiler, and the steam was up at 90 lbs. pressure in sixteen and a half minutes. A jet of water was thrown out of a 1⅜-inch nozzle to a hight of 154 feet, out of a 1¼-inch nozzle 178 feet, and horizontally 225 feet. This is very good throwing, but they do not get up steam quite so fast in London as is done in the New York steam fire engines.

AMERICAN patent revolving clothes driers and folding clothes horses have been introduced into England, and a manufactory of these useful articles has been established at Holburn. Our cotemporary, the *Mechanics' Magazine*, illustrates these inventions, gives due credit for their American origin, and justly commends them for convenience.

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